

THIS WEEK IN THE IRON AGE

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Editorial

Live Longer and Know Less..... 53

Technical Articles

Cost Reducing Program for a Job Shop..... 56
Dissociation Pressures of Metal Oxides..... 61
Melting Rimmed Steel in the Electric Arc Furnace..... 62
Converting Surplus Presses by Arcwelding..... 65
Steel Mill Engineers to Hold Convention..... 66
Massive Forgings for Pulp Mill Machinery..... 69
Test Bar Data V. Casting Properties..... 70
Hydraulic Spacer Replaces Drill Jigs..... 73
A Critical Survey of Controlled Atmospheres (Part II)..... 74
The Ellipsoid Melting Furnace..... 79
German Wartime Technical Developments..... 80
New Equipment..... 81

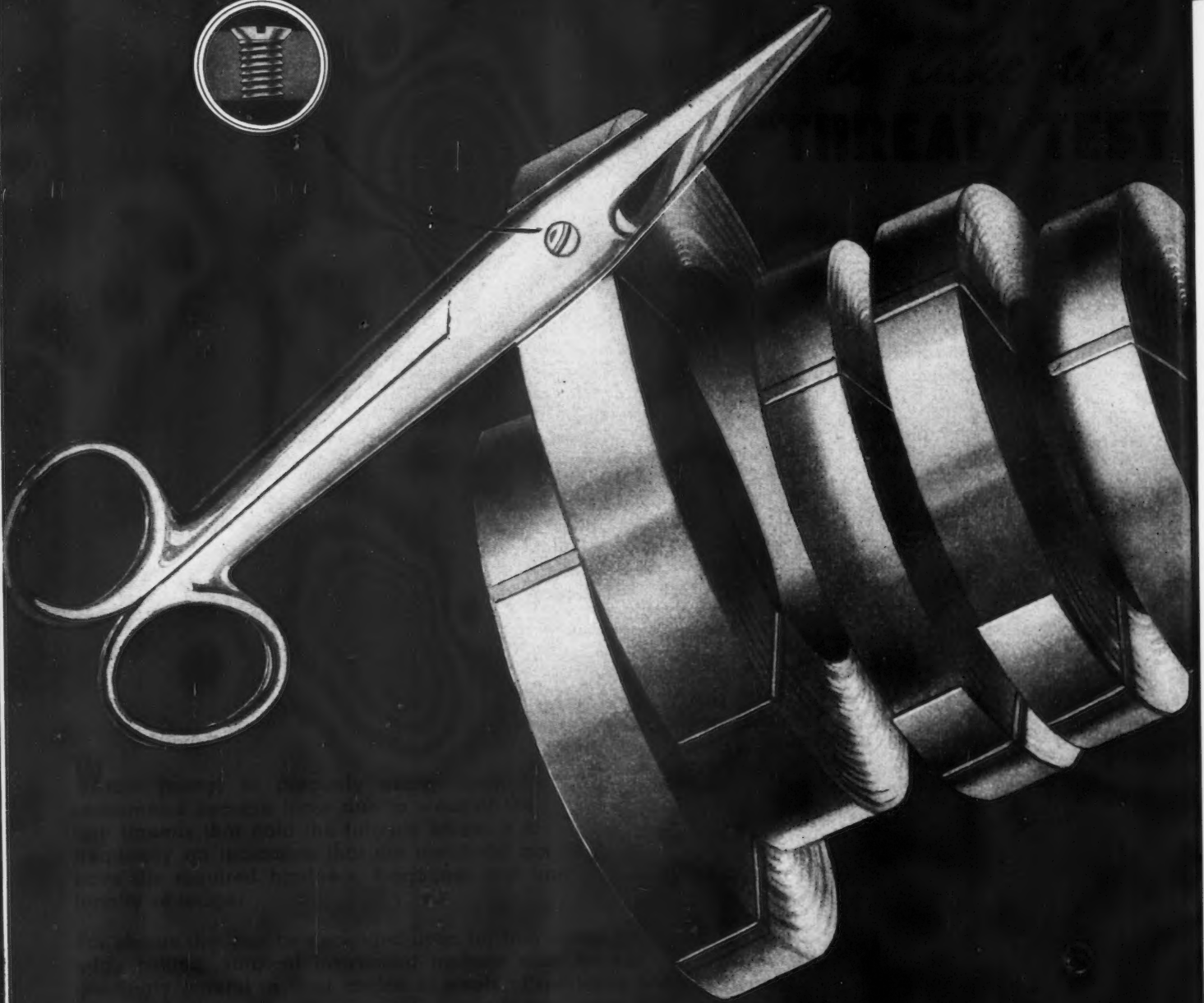
Features

Newsfront..... 55
Assembly Line..... 84
Washington..... 88
West Coast..... 92
European Letter..... 96
Personals and Obituaries..... 100
Dear Editor..... 104
This Industrial Week..... 106
News of Industry..... 109
Gallup Polls..... 115
London Economist..... 119

News and Markets

Industrial Briefs..... 122
New Construction..... 123
Machine Tool Developments..... 124
Nonferrous Market News and Prices..... 126-27
Iron and Steel Scrap News and Prices..... 128-29
Comparison of Prices by Week and Year..... 130
Finished and Semifinished Steel Prices..... 132
Alloy Steel Prices..... 133
Fabricated Steel Products Prices..... 134
Warehouse Steel and Pig Iron Prices..... 135
Ferroalloy Prices..... 136
Sees Atomic Power Possible for 0.8c per Kw-hr..... 137
Freight and Passenger Car Awards Show Gain..... 144
WAA to Review Foreign Surplus Property Sales..... 148
Anti Corrosion Work Gains From Experience..... 152
One Plant to Produce All Jap Iron and Steel..... 154
Aluminum Output Declined Sharply in 1945..... 156
OPA Will Not Change Ceilings on Imports..... 162
USS Plans Wider Steel Use in Homes..... 164
CPA Adds to Veterans' Housing Priorities..... 168
Induction Soldering Speeds Utensil Output..... 169

Index to Advertisers..... 241-42



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Live Longer and Know Less

I HAVE heard it said that the attainment of wisdom is marked by the recognition of one's ignorance. The longer you live, the less you know you know.

I don't know, for example, why the nations of the world stagger along under the tremendous burden of armaments when they would all be so much better off using the money otherwise.

I do not know why capital and labor do exactly this same thing on a smaller scale—though not so small at that—at enormous cost in wages and profits.

I do not know why we educate doctors to preserve life and make people healthier and at the same time accumulate atomic bombs and disease germs in order to wipe them out on a wholesale basis.

I do not know why we send millions of bushels of wheat and other foodstuffs abroad to relieve starvation in devastated countries and at the same time develop bacteriological bombs for the potential purpose of destroying their crops and thus devastating them still further.

There is so much that we do not know, even we who have helped build the technological machine, about the way in which it should be operated for the benefit of all of us.

I do not believe that employers, in general, realize the vital importance of high wages as a principal support of mass production purchasing power.

I do not believe that labor, in general, appreciates the part that technology has played in advancing its living standards.

I do not believe that government officials, in general, appreciate the relationship of a balanced budget to wages and profits as well as taxes.

I do not believe that any of us know enough about the relationship of wages to prices, otherwise we would not have the present day picture of the cat chasing its tail in a vicious upward spiral.


Every mechanism, even the simplest, has potentialities for good or evil depending upon its administration in use. Take a carpenter's hammer. You can use it to help build a house by hitting a nail on the head. You can smash your thumb with it and cause yourself inconvenience. Or you can bash in your neighbor's skull with it, in which case you bring sorrow to his family and expense to the taxpayers for a murder trial.

So too it is with the great machine of production that we call technology. According to its use we can make every one richer in possessions and according to its abuse we can ruin ourselves and destroy civilization.

"For research in technology," recently said Dr. Donald David, president of the Graduate School of Business Administration of Harvard, "we have spent hundreds of millions of dollars by industry and more recently by government. Compared with that, pathetic amounts have been brought to the support of research that will help build a society to use that technology for the general welfare, to administer that technology wisely."

Dr. David said we need a literate economic leadership based on knowledge of facts. You, who read *The Iron Age*, deal in facts. Facts concerning technology. You know how utterly impossible it would be to make a sound casting, produce a usable alloy, design a successful machine, write a worthwhile technical advertisement unless you know and stick to the facts.

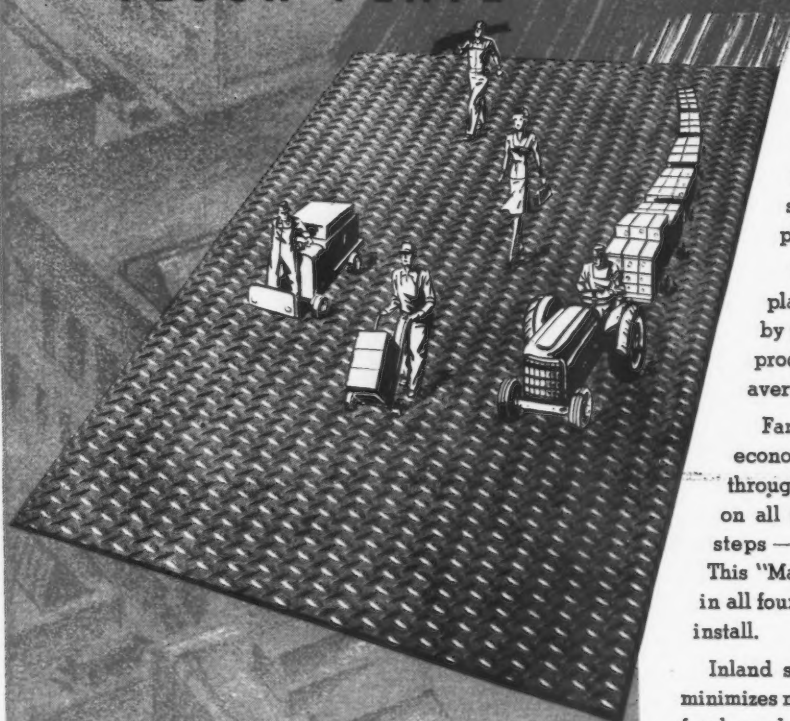
Also, you have the most immediate personal stake in the proper use of the machine that you have helped to build. For unless technological advance is directed to beneficial use, it may well become a Frankenstein monster that will prove to be its own ruin.



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- An American automobile producer is completely designing and supplying the production know-how for a light car to be built in Australia and sold there as an Australian car. It may incorporate certain light car features to be used later in his country. Rigid restrictions on Australian imports plus a 40¢ per hr wage level there were reported to be the important factors in arriving at this decision.
- Farmers are becoming electric power minded, according to electric motor makers who foresee a vast outlet for electric motors and switchgear in this trend. Present power mindedness contrasts with the prewar attitude when farmers thought of electricity primarily in terms of lights, kitchen equipment and milkers.
- Geneva Steel's reconversion to economic distribution of steel making and finishing capacity will probably be completed by the end of 1947. The plate mill is on a schedule of ten turns a week and there is a good chance that the structural mill will be in operation by the end of November.
- M. Joliet-Curie, daughter of M. Curie, en route to Princeton, N. J., where she will speak this week, stated that a small atomic power plant might be built in France within the next two years.
- Britain's head start on jet propulsion is rapidly being threatened by American builders, as evidenced by the 611 mph speed mark set by a Republic XP-84 Thunderbolt jet fighter. The plane was unofficially timed at 619 mph as against an official, though technically still unapproved, record of 616 mph set by a British Gloster Meteor powered by twin Rolls Royce jet engines. The XP-84 is driven by a GE jet engine.
- A new cache of Krupp files said to contain some of the firm's most valuable papers on metallurgy has been unearthed by technical intelligence personnel of the Dept. of Commerce's Office of Technical Services. It is roughly estimated by this group that 3½ billion pages of documents contain information of value to American industry and that 3½ million of them will actually be microfilmed.
- Typical of foreign acceptance of American air transports by foreign lines is the announcement by K.L.M. Royal Dutch Airlines that it has offered its last Bokker to the Curacao Museum. Retirement of this ship means the line will operate exclusively with American aircraft throughout its entire system.
- For some time now the Steel Co. of Canada has been shattering precedent by producing rimmed steel in the electric arc furnace.
- By using the basic electric process, the Hamilton plant, where this practice is carried on, has encountered no difficulty in controlling the phosphorus and sulfur contents to a high degree. The rimmed steels vary from about 0.05 to more than 0.20 pct C with phosphorus usually held to about 0.02 pct max.
- One solution to the shortage of structural shapes is the fabrication of beams and angles through the use of welding. This idea was introduced by Park Iron & Welding Co. when a Cleveland bridge repair job could not reach completion because of the unavailability of the structural shapes.
- The Navy has completed plans for construction of the world's largest human centrifuge—to be used in studying man's reaction to flight at supersonic speeds and for testing equipment for high speed aircraft and rocket projectiles.
- Unemployed Alabamians must now produce evidence of a "conscientious and diligent" search for work before they can draw unemployment compensation. Heretofore, registration at a U. S. employment office was practically all that was required. About 42,000 persons, 30,000 of them veterans, are currently drawing unemployment checks in Alabama.
- Faced with expiration of its authority when the Second War Powers Act runs out on March 31, 1947, CPA is scurrying to wind up its affairs. A top policy memorandum has been circulated through the CPA operating divisions requesting information on orders that might be scrapped before the expiration date, so that the agency may be tapered off, rather than lopped off at one fell swoop.
- Meanwhile some Washington officials are starting agitation to transfer control of tin, crude rubber, antimony and lead to an agency which will not be affected by demise of CPA. In other words, these critical items will probably remain under control for some time.
- The ten giant tires of the new Lockheed "Constitution" commence rotation as soon as the landing gear is lowered into the plane's slipstream. A development of F. Goodrich engineers, molded lugs in the tires' sidewalls start rotation of the wheels to reduce initial landing shock.
- Preliminary estimates of French steel industry modernization carry as targets million metric tons in 1947 and 12 million in 1950. Depending on the decision to purchase one or two continuous strip mills the program will cost 56 or 61 million francs (\$466 million or \$508 million).

Cost Reducing Program for a Job Shop

A cost reducing program, embracing a wage incentive plan, instilling cost consciousness in employees and encouraging suggestions for improving costs, is described in detail in this article. While the program was developed for National Supply, where small quantities of large assemblies are produced, its features lend themselves to ready adaption to general job shop operations. The bonus plan discussed herein has many unusual aspects, particularly the inclusion of all costs in the bonus payment computations.

By **PERLEY C. HAMLIN**

*Industrial Engineer,
National Supply Co., Torrance, Calif.*

WITH positive control procedures, costs can usually be reduced in any organization. The extent to which this can be accomplished depends upon the nature of the business and existing conditions. In a company similar to the Torrance plant of National Supply Co., where small quantities of large assemblies are being manufactured, a different approach to the problem is necessary.

In many respects this particular plant represents a job shop. In the true sense of the word a job shop is one in which no two jobs are the same. Oil drilling equipment is manufactured at National, such as draw-works, swivels and rotaries. Orders are repeated for these products but there are several different sizes and combinations of parts so that a large variety to customer specifications exist. Finished assemblies may not be exactly the same but many of the parts and most of the elemental operations are repeated in the manufacturing process.

A complex scheduling problem exists due to this particular combination and this has resulted in a process layout, the grouping of all similar machines and functions together. Such a condition permits

many opportunities for reducing costs in the foundry, forge shop, machine shop, welding and assembly departments without setting up a product or assembly line procedure. Where job shop conditions exist, highly standardized methods are extremely difficult to obtain, but possibilities for simplifying methods are always present.

The plan of attack at National Supply is threefold.

(1) Cost consciousness must be created among all employees.

(2) The system must be geared to enable installation of methods improvements.

(3) Adequate compensation in the form of bonus should be given for accomplishing the final objective of actually reducing costs.

There are two principal means of reducing costs. The most obvious way is to work faster. This, however, is simply a speedup plan and is restricted in the amount of savings possible. An individual has definite limitations in physical makeup which will permit only a certain production in a given period. Base wages paid to employees is the accepted compensation for a normal expenditure of effort, and it is expected that

PART NO. <u>Mach. 236</u>		THE NATIONAL SUPPLY COMPANY TORRANCE, CALIFORNIA		LEAVE BLANK CASE NO. <u>72-C2-1</u>	
		COST IMPROVEMENT PROPOSAL			
SUBJECT <u>Drill Collars</u>					
Present Method			Proposed Method		
<u>Truing up the tail stock end of Mach. 236 which is used for threading Drill Collars, Subs. etc. Now requires 2 men. One man operates the machine while the other watches the indicator and makes adjustments</u>			<u>Install remote control switch on tail stock enabling operator to true up Collars, subs etc. without extra helper.</u>		
PROPOSED BY: <u>John Doe</u>			DEPT. NO. <u>2</u>		DATE <u>7-2-46</u>

USE REVERSE SIDE OR EXTRA SHEET IF REQD.

FIG. 1—Suggestion form used for making a cost improvement proposal.



Program Reduces Manufacturing Costs

Can you see in the above picture 361 lost man hours or a possible savings of \$775.00 to be realized through the installation of simple machine improvement?

The machine shown in the picture is a Lees Bradner Thread Milling Machine used in our manufacture of Drill Collars, subs and Kelly's. In order to maintain our high quality product, it is necessary

FIG. 2—Suitable publicity for cost improvement proposals which are adopted is given in the company publication, as illustrated here, to improve employee participation in the program.

the company will receive this amount of work without additional bonus. The most lucrative way of reducing costs is through the medium of work simplification¹. This can be accomplished by altering physical motions to conserve human energy or by means of new processes which reduce the time involved or conserve on indirect expenses.

Changes in methods such as the use of jigs, fixtures,

¹ A booklet containing a series of articles covering time study calculations, method simplification as applied to time study, incentive plans and job evaluation has been compiled by THE IRON AGE. Copies are available to readers at 60¢ a copy.

or new equipment, improvement in the design of products, motion economy or layout have infinite possibilities of reducing costs without affecting the amount of energy expended. It is by this means that National hopes to reduce costs and to pay the employees something in addition to their regular base wage to accomplish this.

Ideas from the employees as well as management need constant stimulation to bring out every possible good suggestion. Such suggestions may sound good but may not always result in savings to the company. Quantities of production may not be sufficient to warrant the investment of equipment required to install a new process. Suggestions on improved standard cooling may reap handsome savings because there are over 20,000 active parts, most of which must be machined. Some changes in layout may also reduce handling costs because a difficult routing problem exists. Design of products may have considerable effect on cost, not only in the machining operations, but in the foundry or forging operations. In a plant similar to a job shop opportunities are very good for almost anybody to find many simple ways of reducing costs. Fig. 1 illustrates a form used for proposing cost improvement methods.

Where a change is to be made which requires an expenditure before final installation becomes effective, a staff of four engineers makes cost analysis of all suggestions. If it is found that the idea will result

in an ultimate savings to the company, the suggestion is accepted. If the idea results in an increase in costs, the suggestion is rejected. So far, in over a year of operation, less than 50 pct of all suggestions have been rejected and over \$100,000 savings a year have been indicated. The value of this program speaks for itself.

Each suggestion is carefully gone over with the originator to help him as much as possible in making improvements. So far no reward has been given for these ideas. Complimentary publicity is given in the plant paper for the best suggestions to stimulate interest, as shown in fig. 2. It is believed that suggestions will fall off in time not only because interest may wane due to lack of financial rewards for these ideas, but because many of these ideas have been on employees' minds for some time and needed stimulation to bring them out. As soon as suggestions begin to taper off plant engineers will supplement the present program by investigating costs and methods for further improvements.

There is usually a certain amount of resistance to having engineers analyze methods and costs in a department. Full cooperation is not gained in the department for the best improvement. However, by attaching a bonus to the plan to be paid when costs go down, the employees of a department will be much more apt to welcome the engineers if not actually ask for their assistance to help cut costs.

The primary objective of measuring performance is to obtain a basis for paying bonus. All costs are included for each department separately and the established standard is the average cost of the previous year. Bonus plans applied to small groups become more effective than plant-wide plans. The small group can see what they, as individuals, contribute to bonus earned. Any reliance upon the efforts of others is minimized. All costs must be included where the objective is overall cost reduction and it is relatively simple to obtain such costs by departments. Although the incentive is greater when the

effort of an individual is measured it is almost impossible to follow through on the measurement of all savings as a result of an individual's contribution to an idea. Productive labor is about the only phase of cost where the efforts of a single person can be measured.

The previous year's productive time was used at this plant to reflect any changes in this cost. Although these time values do not show what a normal day's work should be, the cost of time study standards would be tremendous for this particular plant because there are over 100,000 active operations. A great deal of controversy always arises in regard to the fairness of time study standards. Grievances and pressure from organized labor have in many cases been known to result in increased costs as a result of this approach. In addition to productive labor, all other costs should also be included if a bonus is to be paid on the basis of reducing costs and if all employees are to be included in the plan. Therefore it was decided to simply use, at this plant, the average costs of operating each department in the previous year as standard. Any changes in this cost reflect a savings or a loss.

The principle of bonus is to compensate for something in addition to that which is normally required. A later discussion will explain how abnormal costs due to negligence or high costs as a result of idle time are eventually eliminated.

Previous year's productive times were taken directly from cost accounting records. Fig. 3 shows an Acme Flexoline file which will hold standard times for over 20,000 parts and 100,000 operations. Each file covers 10,000 parts and only two were required for all operations in the plant. This makes a compact file, and is a fast reference medium. The part number and name, operation numbers and symbols, the average time per operation, and the date are all shown on each strip which is a third of an inch wide (normal typing space) and 5 in. long. Productive operational standards are extended daily for all finished work. No standards are applied to defective work. Standard time is summarized monthly for each department, representing volume of work finished in the department for the period.

The average hourly rate for the previous year is applied to standard (previous year's) time and the current average hourly rate for the department is applied to the actual time taken to do these jobs. The result is a true comparison of the difference in productive labor costs for these same jobs between the previous year and the current month.

The change in indirect labor cost over the previous year is obtained as follows: The total indirect hours for the previous year are divided by the total productive hours for each department. This gives a ratio of actual indirect hours per productive hour in the previous year. For example, if there were 71,511 indirect hours in the molding department during the previous year and 74,182 productive hours, the standard ratio would be 0.964 indirect hours per productive hour. Assume that for molds made in a current month it would have taken 6065 productive hours in the previous year. If it required 0.964 indirect hours per productive hour in the previous year and it took 6065 productive hours in the previous year then it would have taken $0.964 \times 6065 = 5847$ indirect hours in the previous year to make these same molds which are being processed in a current month. Provided there is no change in performance over the previous year

it would take 6065 productive and 5847 indirect hours to duplicate these parts. Actually it took 5547 productive and 4415 indirect hours in the current month. This is a saving of 518 productive and 1432 indirect hours, or a total of 1950 hours saved. If the hourly rate in the previous year was \$1.18 and now is \$1.29 a summary of the change in cost would be as follows:

	Prev. Year Average Std. Cost	Current Monthly Actual Cost	Variance In Cost	Change In Cost, Pct
Productive.....	6,065	5,547	518	8.5
Indirect.....	5,847	4,415	1,432	24.5
Total Hours.....	11,912	9,962	1,950	16.4
Rate/Hr.....	\$1.18	\$1.29		
Total Labor....	\$14,056	\$12,851	\$1,205	8.6

Although there was a 16.4 pct reduction in hours, the dollar reduction in labor cost is only 8.6 pct due to wage increases.

Indirect variable expenses such as supplies, repairs, tools and power are computed in the same manner as indirect labor. A standard ratio of these costs to productive hours is developed based on the previous year's dollar costs. This ratio is multiplied by the current standard productive hours. Any difference is an increase or decrease variance cost in dollars.

It is a matter of opinion as to whether there are any true expenses which vary in direct proportion to productivity or not. It has been claimed that there are always some costs at zero production even in those normally considered variable such as indirect labor and power. Correlations of these expenses back into the depression period when National was barely operating reveal some apparent standby costs in those elements of cost called variable, as indicated in fig. 4. At near zero production the general policy is to hold good indirect workers as long as possible until productivity increases. Such a policy is logical but definitely inefficient. There is a tendency for indirect costs to lag behind direct cost during any change in volume of production. High points in these correlations at near zero production usually represent inefficient periods. For this reason a straight line curve has been selected as standard in this plan which starts from the zero axes, permitting a simple and accurate method of measuring variable cost changes between two periods.

The largest portion of standby costs are fixed, as taxes, insurance, depreciation, rent and those expenses which do not materially change from year to year. Standards on such fixed costs are obtained by dividing the total expenses by the number of months covered in the previous year to obtain a constant amount per month. Such fixed costs as depreciation may be considered to be a questionable element of cost to include. It is a very important item not only from the point of view that all costs are to be included, but particularly where equipment changes and additions are made. Where a more productive machine replaces another machine, depreciation expenses must be deducted from gross savings before bonus is paid, because bonus will be paid on net savings only. Expansion programs, however, require a revision of fixed expense standards.

A summary of all costs are made before the final



department performance is computed as illustrated in the following table:

	Prev. Year Average Std. Cost	Current Monthly Actual Cost	Variance in Cost	Change in Cost, Pct
Labor.....	\$14,056	\$12,851	\$1,205	8.6
Variable Expenses.....	8,612	7,438	1,174	13.6
Fixed Expenses.....	1,591	1,685*	94*	5.9*
Total Cost Perform.	\$24,259	\$21,974	\$2,285	9.4
* Increase				

Although there was an 8.6 pct reduction in labor and a 13.6 pct reduction in variable expenses, fixed expenses increased 5.9 pct due to the installation of a more modern machine which in turn resulted in a net reduction of 9.4 pct in cost in the department for the month over the previous year's average.

The measurement of cost changes in each department over the previous year makes an excellent basis for bonus payment where work simplification is the primary objective. Since the standards change each year, a bonus can be paid for a year for a work simplification idea. The plan is not intended to be a speedup plan. It is expected that a normal day's work in the expenditure of energy will be received by the company for the base wages being paid. It is only for something in addition to that which is normally required that a bonus is paid. There are infinite ways by which overhead costs can be reduced without undue exertion on the part of the worker. These expenses are difficult to control by management and it is costly to set up such controls, particularly in a job shop. The plan described here gives the foreman and worker a large part in these responsibilities. In order to avoid a no bonus situation after a few years because of yearly changes in standard, a partial bonus will be allowed for maintaining the low costs attained.

New parts and products are always being made on which no previous time exists. On such products

FIG. 3—Compact and fast reference file (above) contains more than 100,000 operational standard time values. Strip at right gives detail of file material showing part number, operation number, machine symbols and time values in decimals

o o o

CLEVIS	.1140	.100	.165	.210
60 F	.010			
33L 047 LINK AS	10 EW .140	20 SB .050	30 B .100	40 F .040
	70 F .050	77 SB .090	80 FP .030	90 F .030
	110 RD .1025	120 B .070	130 F .040	140 F .100
	170 B .060			
33L 047-2 LINK AS	10 EW .150	20 SB .050	30 B .040	40 F .030
	70 F .050	77 SB .070	80 FP .060	90 F .030
	110 RD .050	120 B .050	130 F .050	140 F .150
	160 B .070			
33L 047-8 TUBE	10 PS .080	20 B .050	30 B .030	
33L 047-9 TUBE	10 PS .090	20 B .040	30 B .050	
33L 049 SHAFT	10 WS .100	20 HT .050	30 F .020	40 F .020
	60 RD .160	70 B .060	77 F .020	80 F .020
33L 050-2 BRACKET	10 MM .120	20 MM .070	32 RD .040	33 RD .050
	50 B .280	60 F .050	70 E .050	80 E .050
33L 051 PLUG	10 WS .130	20 HT .020	40 F .010	50 F .020
	70 WS .170	80 B .050	90 F .010	100 F .030
33L 052 STOP	10 SH .010	20 SD .060	30 B .060	37 HT .030
	40 F .010	50 F .010	60 B .010	
33L 053 BOLT	10 WS .160	20 JL .070	30 SD .130	40 HT .060
	70 F .020	80 GR .070	90 WS .080	100 TGR .080
	120 F .020	130 F .040		
33L 054-2 COLLAR AS	10 F .100			
33L 054-6 COLLAR	10 WS .150	20 WS .170	30 MM .255	40 RD .360
	60 B .040	70 F .040	80 F .020	90 B .020
33L 055-6 COLLAR	10 WS .048	20 WS .030	30 MM .040	40 MM .020
	60 B .140	70 F .040	80 F .050	90 B .050
33L 056 ROD	10 PS .020	20 HT .030	40 F .020	50 FP .020
	57 PS .020	60 WS .030	60 TGR .020	67 F .020
	80 F .020			
33L 057 BUSHING	10 WS .152	20 WS .016	30 WS .100	
33L 060 SHAFT	10 PS .090	20 HT .120	40 F .040	50 F .040
	70 L .040	80 GR .050	90 RD .075	100 TGR .200
	120 F .030	130 F .100	140 B .100	
33L 061-L SHAFT	10 PS .150	20 HT .200	40 F .050	47 IT .150
	70 L .130	80 L .110	90 GR .100	100 RD .140
	120 B .500	130 F .050	140 F .100	150 F .100

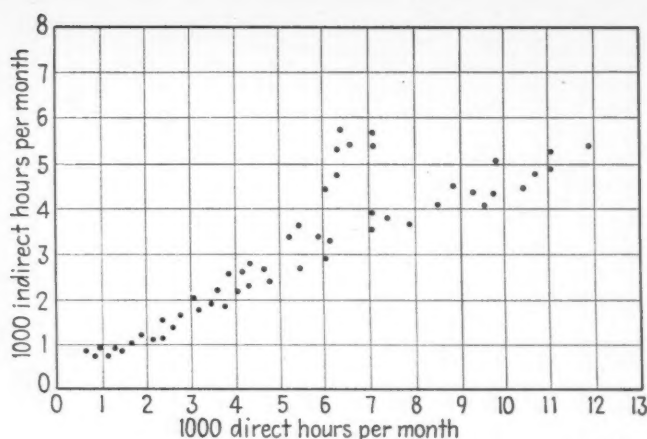
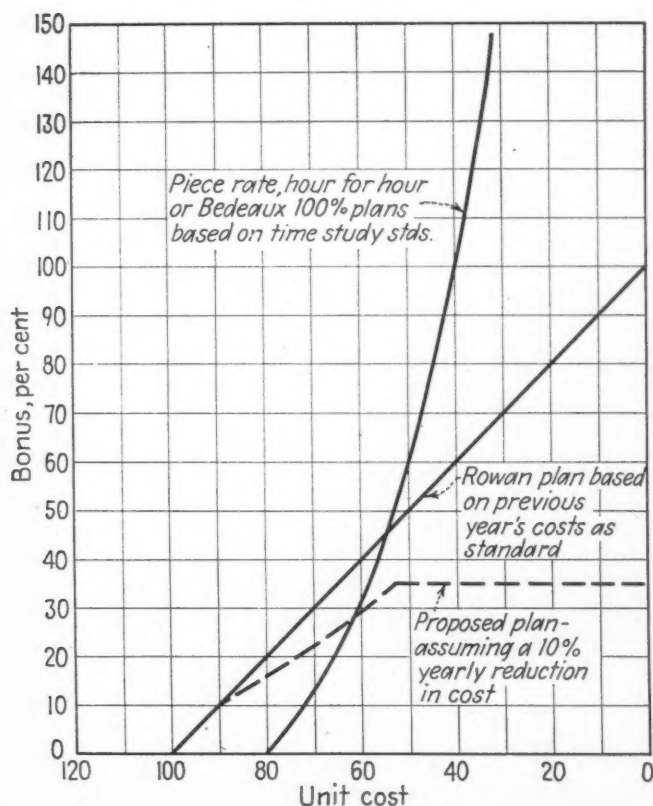


FIG. 4—A comparison of direct and indirect labor. Inefficient periods are shown by the high points between 6000 and 7000 hr, and also toward the zero point.

represent progress and should be encouraged. Plans guaranteeing standards result many times in opposition to method changes. One of the oldest objections to bonus plans was that the standards were frequently changed. Workers felt that such changes were made because the bonus was too high. Progress in changing methods necessitates changing standards. Even today in such guaranteed standard plans when the bonus is high, some companies look for a change in method in order to cover up a poor standard or for the purpose of eliminating easy jobs. The National plan overcomes these objections by guaranteeing a permanent formula and a standard for the period of a year only. The plan is maintained at a minimum of cost with the help of only three comptometer operators.

FIG. 5—A comparison of various wage incentive plans. Curves indicate the bonus earned, in percent, for various unit costs with each type of plan.



Actual bonus payments have not started to date. A trial run of performance is in operation while details of performance and bonus participation are being completed. One of the most acceptable proposals on which bonus could be paid is to permit a 1 pct bonus for each 1 pct reduction in cost for any month. Percent reduction in cost, as previously outlined, includes all expenses and all factory employees would participate. Each department's performance is computed separately and the previous year's average costs are used as standard. Each year the standards are revised, but a maintenance bonus of one half the first year's bonus would continue as a permanent bonus provided performance remained constant. Any additional reductions in the second year would receive 1 pct bonus for each 1 pct reduction in cost. At the end of the second year, one half the additional bonus made in that year would be added to the half earned in the first year, which would constitute the permanent bonus for the beginning of the third year. This process continues until a bank of 25 pct has been built up in the department beyond which no further bonus can be obtained from this source. The net result is a normal bonus for maintaining low costs. By the time a 25 pct maintenance bonus is reached costs must be cut in half from the time the plan starts. From surveys in this particular plant it is considered possible to accomplish this result.

Some departments can reduce costs more than others. For this reason each department is given only 0.75 pct bonus for each 1 pct reduction of its own department costs, to which 0.25 pct is added for each 1 pct reduction in the overall plant costs. This feature tends to develop cooperation between departments, preventing cost cutting in one department at the expense of another.

The plan also permits high participation in small savings and smaller participation in higher savings where labor costs are reduced. If costs, covering labor only, are reduced 10 pct then 90 pct of the savings go to the workers. For example if costs of \$100 were reduced to \$90 a \$10 or 10 pct gross savings is made on the product and 10 pct bonus is paid, but only on \$90 of labor. Bonus paid would be \$9, a net savings \$1 to the company. However, if a 20 pct reduction in costs is made, 80 pct of savings is given to the workers, down to a 50 pct reduction where 50 pct of savings is bonus, or a splitting of savings between the worker and the company. Where overhead costs exist in this plan the company receives a greater ratio of savings as the ratio of overhead increases. If overhead costs equal labor costs and the efficiency of labor does not change then the overhead savings are divided between the company and participants. If overhead is twice labor and labor efficiency does not change then the company receives twice the savings. In other words, as the company's responsibility increases the net savings increases. As labor becomes more efficient, usually as a result of larger investments in equipment, the company's return from savings is also greater. The whole plan is balanced to place emphasis on specific responsibilities.

Due to the method of calculation, (Rowan Plan) no excessive bonuses occur and it is simple to explain. The only explanation necessary is that if costs go down, a 1 pct bonus will be paid for each 1 pct reduction in cost. Three quarters of the reduction in cost for bonus purposes is taken from each department's performance and one quarter is taken from the overall plant's reduction in cost. Added to this

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bonus will be one half all bonuses earned in previous years up to a maximum of 25 pct. The net percent bonus is multiplied by the base wage of an individual to obtain the bonus dollars earned for the period. All monthly periods start without penalties from previous months in the year. Each year one half the average percent increase or decrease in cost will be added to or subtracted from previous bank earnings. This plan approaches profit sharing. If costs go down, profits are increased and the company shares these profits with the employee.

The initial installation will be for keymen only, from foremen to plant supervisor. When major difficulties are ironed out, the plan may be offered to all workers without change. The accompanying chart, fig. 5, illustrates the approximate comparison of bonus earnings on this plan compared to other well known plans. The assumption here is that costs are reduced 10 pct each year on the proposed plan. Any other reduction per year would not materially effect the ultimate curve. The important point is that bonus starts sooner for improvements and definitely has control as time goes on. Normal bonus in most plans is about 20 pct. Under present conditions, this plan

should about equal that figure in a reasonable length of time. Example of bonus calculations are as follows:

Department	Current Monthly Cost Change, Pct	Previous Year's Bank Bonus	PERCENT BONUS		
			3/4% Dept.	1/4% Plant	Total
Plant (Average).....	16.4	.....	.....	4.1	.....
Molding.....	9.4	5.4	7.0	4.1	16.5
Chipping.....	4.3*	2.6	3.2*	4.1	3.5

* Increase

All bonus percentages are added algebraically. In the above example the chipping department increased costs in the current month by 4.3 pct. Only three quarters of this is deducted (3.2) from other bonuses, resulting in a net percent bonus of 3.5 pct.

Acknowledgment

The author expresses his appreciation to K. E. Hansen, superintendent of the industrial relations department, not only for suggestions offered in the preparation of this discussion, but also for the fact that he was the instigator of the program outlined herein. Credit is also due R. W. Miner for his contribution to the suggestion system of the cost improvement program.

Dissociation Pressures of Metal Oxides

A FACTOR of prime importance in determining the oxidation behavior of metals at elevated temperatures in air and in industrial atmosphere is the dissociation pressure of the metal oxide formed on heating. From available thermodynamic data, the dissociation pressures have been calculated as a function of temperature and are presented in the accompanying figure. The equations utilized in the solution and the plotted data have been reported by B. Lustman, research engineer, Westinghouse Research Laboratories, East Pittsburgh, Pa., in a paper entitled "Dissociation Pressures of Metal Oxides Formed on Various Solid Metals."

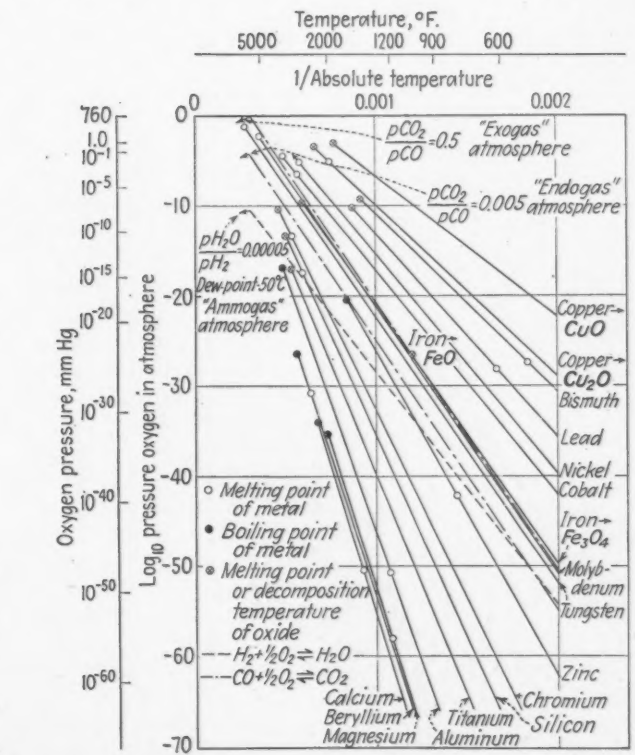
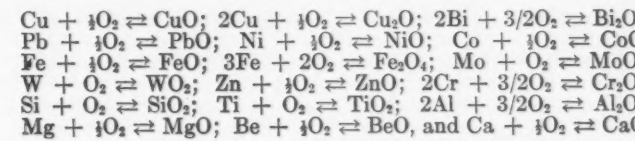
Since data for the solid metals were used, the curves are valid only up to the melting point of the metal (shown as open circles). However, since little change in the curves would be introduced by considering the change in state of the metal and since adequate data are not available for making this calculation, the curves were extended to the boiling point of the metal, or the melting or decomposition temperature of the oxide, whichever was lower.

Also included in the graph are curves for oxygen partial pressures in equilibrium with CO-CO₂ and H₂-H₂O mixtures typical of industrial furnace atmospheres such as "Endogas," "Exogas," and "Ammogas." Since for these gas mixtures,

log p_{O₂} = 2 log K + 2 log p_{H₂O} p_{H₂} or 2 log K + 2 log p_{CO₂} p_{CO}

the oxygen partial pressures for atmospheres of differing component ratios may be derived from the depicted curves by shifting the curves parallel to the ordinate an amount equal to twice the logarithm of the desired to the known ratio. Thus, the oxygen partial pressure for a gas atmosphere .100 times richer in CO₂ than the ratio p_{CO₂} p_{CO} of 0.005 lies 4 logarithmic units above the latter.

For any given atmosphere, the metal will not oxidize if the dissociation pressure of its oxide is greater than the oxygen partial pressure of the gas atmosphere. Calculations for the various plots are based on the following relationships:





TAPPING a heat of rimmed steel from a 70-ton basic electric furnace.

STRIP, sheet, plates, wire and other carbon-steel products requiring a good surface finish are produced from rimmed steel. This type of steel is normally the output of the bessemer and open-hearth furnaces, while the electric arc furnace has, in the past, claimed the distinction of giving birth to only the high grade, more costly, alloy and tool steels. This exclusive classification has been shattered by the Steel Company of Canada, Ltd., where for the past 3 yr the Hamilton, Ontario, works has been producing rimmed steel in a 70-ton basic-lined, electric furnace.

Rimmed steel is that type of steel to which little or no deoxidizer is added, and which solidifies with the evolution of a great deal of carbon monoxide gas; in other words, the various furnace oxidation reactions are permitted to continue in the molds. The evolution of gases causes a boiling action that interferes with the growth of columnar crystals (characteristic of killed steels) and promotes the formation of a tough, ductile skin. Because of the effervescence, which continues to stir the remaining liquid until final solidification takes place, there is no pipe formed. Some of the gas is trapped within the mold, and lines-up under the surface, as shown in fig. 1. A thin-skinned ingot is liable to produce surface defects because the blowholes are too close to the surface, while a skin that is too thick will cause difficulty in rolling to the thin gages. As compared with fig. 1, killed steel solidifies quietly without evo-

lution and always contains a pipe at top center of the ingot.

Using the basic electric process for production of rimmed steel, the Hamilton plant has encountered no difficulty in controlling the phosphorus and sulfur contents to a high degree. The rimmed steels produced vary from about 0.05 to more than 0.20 pct carbon, see table I, and although specifications allow a phosphorus content up to 0.10 pct, it is usually held to about 0.02 pct max. This characteristic of the basic electric process makes possible the use of a cheaper grade of scrap, since selection with regard to sulfur and phosphorus contents is rendered unimportant.

Furnace Characteristics

The furnace used is a 12,000 kva, 3 20-in. electrode (graphite) unit, with a power factor average of 0.83 over a period of 3 yr continuous operation (the lowest power factor recorded is 0.78). The power consumption is about 550 kw-hr per ton steel produced. The total electrode consumption is reported to be about 12.8 lb per ton steel produced. The furnace has a 20-ft shell and is door charged, with the use of charging machines, as illustrated in fig. 2.

The roof is constructed of silica brick, 12 in. thick. Typical of basic, arc-furnace roofs, the life is short and variable, the average life in this case being about 55 heats.

The side walls are constructed of metalkase basic

Melting Rimmed S

By E. S. KOPECKI
Associate Editor

Production of rimmed steel in the electric arc furnace, heretofore believed impracticable, has been accomplished by the Steel Co. of Canada for some time. The economical factors compare quite favorably with the openhearth, aided greatly by the low down-time of the electric furnace, as well as low cost of power furnished by Niagara Falls. Details of the production procedure are presented herein.

Steel in the Electric Arc Furnace

brick (chemically bonded). The wall thickness is 18 in. from sill to top of door arch, and 13 in. from door arch to skew. The life of the wall lining is from 160 to 180 heats.

The bottom material in contact with the molten metal is Ramix 65 (10 in. min), backed by 12 in. chrome magnesite brick, backed by 3 in. clay brick. Only two bottoms have been laid in this furnace to date—the first bottom had a life of 1700 heats and the second has withstood 1600.

For dressing-up operations conducted between heats (fettling), double-burned dolomite (not burnt in) is used. A typical dolomite chemical analysis is: CaO—47 pct, MgO—32, SiO₂—12, Fe₂O₃—5, and Al₂O₃—4 pct.

Where rather extensive bottom repairs are necessary, as for example to fill a deep hole, the ramming mix is used, mixed wet and thrown in by shovel. No "burning-in" is done following repairs—scrap for the next heat is immediately charged. For making a new bottom, however, the bottom material is burned-in for 18 hr, using broken electrode chunks for contact.

The placing of the scrap and the proportions of light and heavy scrap used in the charge are important from the standpoint of eliminating bottom difficulties and promoting rapid melting. With the arc concentrated on the heavy melting scrap, which is on the bottom of the charge, the heat will melt from the bottom up and a constant arc can be maintained.

Charging is done as two separate additions. The first addition, which is 75 pct of the total scrap charge, is composed of (1) about 40 pct of the total scrap charge as mill crops, (2) about 35 pct of total as purchased heavy melting scrap, (3) 2000 lb light scrap, (4) 1500 lb sinter, (5) 500 to 1200 lb graphite turnings—depending on carbon content desired, and (6) 2000 to 3000 lb lime.

The sinter, which is made from flue dust and fine ore screenings, is highly important in building an active bath, and providing a high-oxide slag. Since no oxidizing gases are present, as in the openhearth, the FeO content of the slag is controlled by the amount of oxygen (in the form of a solid oxide) which is admitted to the furnace. Also, in order to obtain an elimination of phosphorus from the bath, it is necessary that the slag be highly basic (as well as high in FeO content—about 15 pct). The high basicity is obtained from the lime additions.

After melting-down, the first helper withdraws a sample for a preliminary test of the carbon content. If the analysis shows that carbon additions are necessary, cold pig iron or crushed electrode is charged with the second charge. The balance of the light scrap—which amounts to about 20 pct of the total scrap charge is then added—in the openhearth the addition is about 5½ pct. The melt-down is performed using 265 v, and working at 190 to 110 v.

A typical log of the sequence of operations in melting a heat of SAE 1025 steel is listed in table II.

The slag analysis is checked during the course of

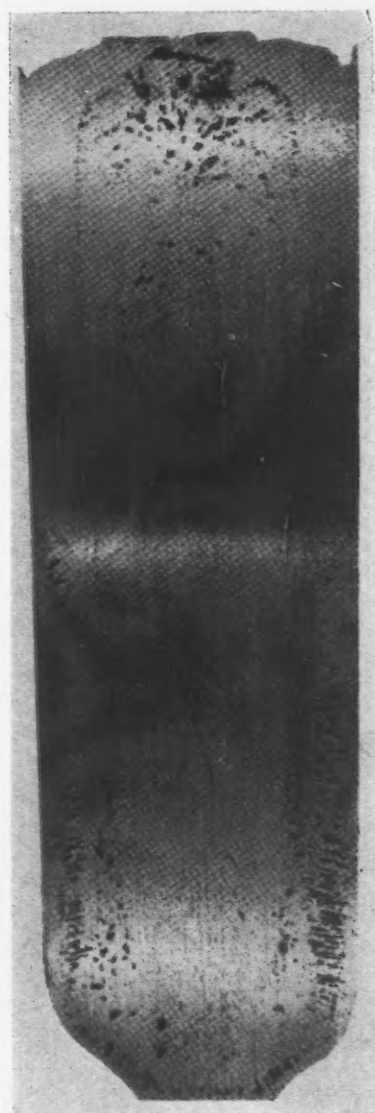
the heat in order to maintain a lime:silica ratio of 3 to 3.5:1, since for rimmed heats a relatively high basicity is required to maintain sufficient oxide in the slag. This is highly important since both phosphorus and sulfur removals are affected by the lime:Silica ratio and the FeO content. For heats containing less than 0.10 pct carbon, it is attempted to maintain at least 14 pct FeO in the slag, while higher carbon heats generally run 10 to 12 pct FeO in the slag. As a rule, it has been found that the slag FeO content is generally about 1 to 2 pct less than a comparable heat in the openhearth.

Function of Slag

In addition to the high basicity (CaO) and high oxidizing power (FeO) desired in the slag, it is important that the slag not be too viscous, since a fluid slag is more reactive with the bath than is a sluggish slag and the removal of phosphorus and sulfur is more complete. In view of the fact that increasing basicity results in an increase in viscosity, fluorspar is added to the slag to prevent a high lime slag from becoming excessively viscous.

The lime:Silica determination is made by pouring out a slag sample on a flat plate and grinding it into a powder. To the ground slag that passes through an 80 mesh screen, distilled water is added and the mixture is allowed to stand for 10 min. A pH determination is then run, using a glass electrode. From experimental tests, the laboratory has been able to plot a "pH v. lime:Silica" curve, so that conversion from pH

FIG. 1—Cross section longitudinal section of 0.08 pct C rimmed steel ingot split through center.



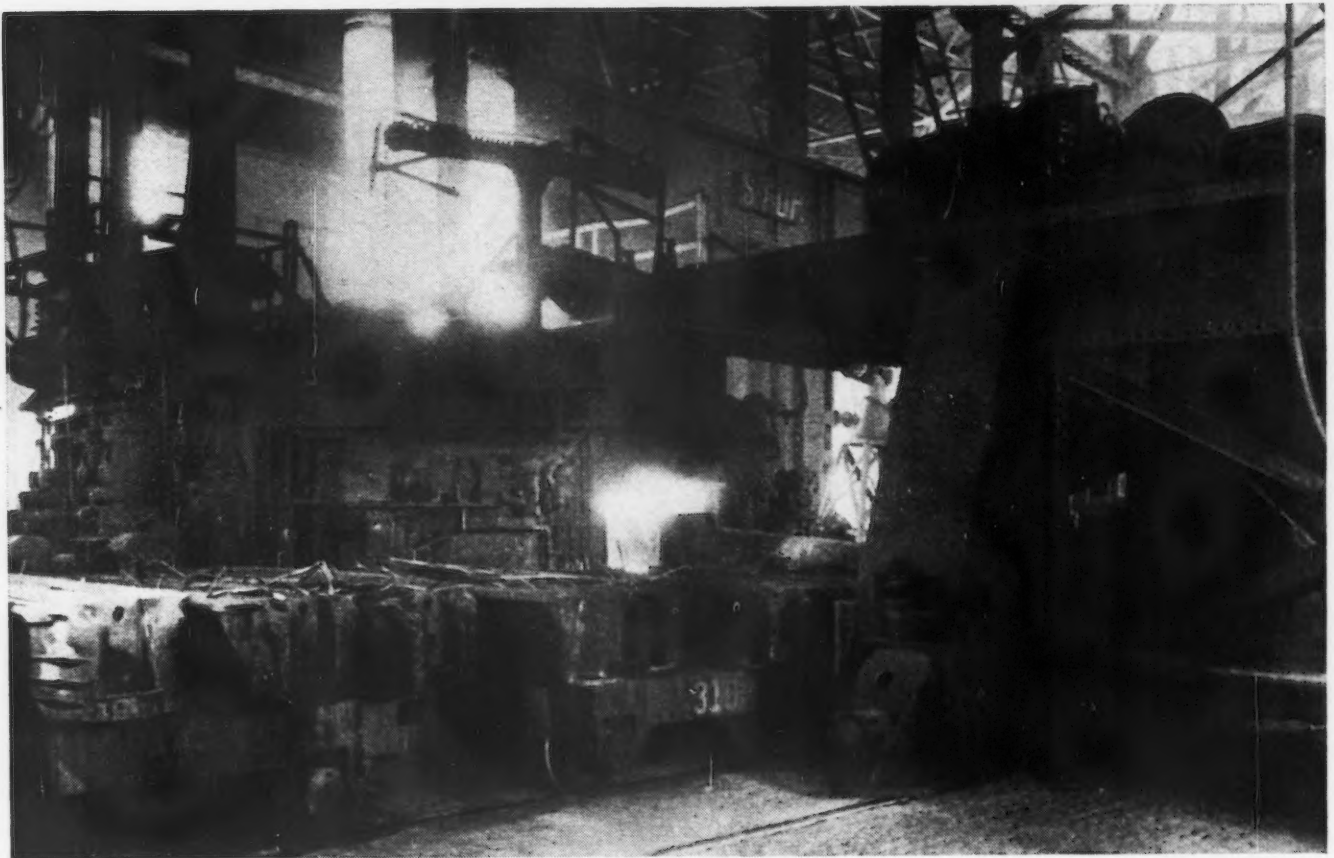


FIG. 2—Machine charging an electric furnace for production of a 72-ton heat of rimmed steel.

determination to lime:Silica is readily performed. It has been found that this method has equal accuracy to the pancake method for ratios up to 2.5:1 and has greater accuracy for ratios higher than 2.5:1—and has the advantage that the test takes only about 15 min.

The Carbometer has been substituted for the fracture test in analyzing for carbon content of the heat. In this test, the molten metal sample is killed in the spoon with a measured amount of aluminum wire (in proportion to the estimated carbon content). After it has been cooled by water quenching, the test piece is exposed to the alternate action of two magnetic fields of different intensity. After a few reversals, the induction becomes sufficiently constant for practical purposes. The armature then revolves a quarter revolution and induces a quantity of electricity in the coil in which the specimen is inserted. This is measured by a galvanometer

which is calibrated to give the per cent carbon reading.

The rapidity with which the electric furnace heats up makes it necessary that precautions be taken against getting the heat "too hot"—although no physical temperature testing is done—because this adversely affects the rimming action of the steel.

In tapping the heat, the furnace is tilted and metal (72 tons) and slag pass through a 4-in. tapping hole

TABLE I
Chemical Compositions of Various Rimmed Steels Produced

	C, Pct	P, Pct	S, Pct	Mn, Pct	
Sheet bar (deep drawing).....	0.07	0.020	0.028	0.20-0.30	
Chain.....	0.05-0.08	0.03	0.04	0.20-0.35	
	0.10-0.15	0.03	0.045	0.35-0.50	
Cold drawing.....	0.15-0.20	0.04	0.045	0.60-0.75	
	0.22-0.28	0.03	0.045	0.30-0.50	
Culvert stock.....	0.05	0.02	0.035	0.15-0.20	0.20-0.30 Cu
Sheet bar*.....	0.05-0.07	0.03-0.10	0.03-0.05	0.20-0.30	Cu 1/2 %

* Rephosphorized—Ferrophosphorus added to ladle.

TABLE II
Sequence of Operations in Melting SAE 1025 Rimmed Steel in the Electric Furnace

4:35 p.m. — First charge — 2 buggies of crops					
1 box sinter. 1400 lb contained Fe.					
2 buggies crops					
2 boxes lime — 2400 lb lime					
6 bags crushed electrode — 600 lb					
3 buggies plate ends					
(Total 103,500 lb scrap in charge)					
4:55 p.m. — Power on					
6:25 p.m. — Snap — 0.25-C					
6:45 p.m. — Power off. Recharge — 4 buggies scrap					
1 box lime — 1200 lb					
3 bags crushed electrode — 300 lb.					
5 buggies scrap					
(Total 33,500 lb scrap in recharge)					
7:15 p.m. — Power on					
8:50 p.m. — Snap — 0.43-C Snap to lab. P 0.022 S 0.061 Mn 0.33 Scrap in furnace					
9:40 p.m. — Snap — 0.25-C Snap to lab. P 0.020 S 0.046 Mn 0.28					
(FeO — 10.3)					
(Lime Silica ratio — 3.5:1)					
10:05 p.m. — Snap — 0.18-C					
11:20 p.m. — Tapped					
Added in ladle — 500 lb Manganese					
150 lb Mexican graphite					
Specified Analysis: C 0.22-0.28 P 0.03 S 0.045 Mn 0.33-0.50 Si —					
Steel made: 0.262 0.013 0.042 0.51 0.002					
Time of Heat — 5 hr 45 min					

into the ladle. Manganese and aluminum additions are made, depending on the carbon and FeO contents of the metal and slag, in order to control the rimming action. In the case of rephosphorized steel, phosphorus is added in the ladle to specification. From the ladle, the steel is bottom-poured into 4.5-ton, big-end down, ingot molds, which measure $23\frac{3}{4} \times 25\frac{3}{4}$ in. top cross section \times 70 in. long. It has been found that a $1\frac{3}{4}$ -in. nozzle in the ladle is most satisfactory for steels containing up to 0.15 pct carbon and a $1\frac{1}{2}$ -in. nozzle for steels containing more than 0.15 carbon.

Economic Factors

The electric furnace yield is about 93 pct, which compares favorably with an openhearth yield of about 89 pct. A lower metal loss is realized in the former since it makes use of a lower slag volume than the openhearth. The furnace output does credit to the process, since it produces an average of ap-

proximately 9.8 tons steel per hr (tap to tap), while a 100-ton openhearth on the same floor produces 8.5 tons per hr. Also, other advantages are (1) the availability of the furnace (97 pct) to produce steel is greater than the openhearth (92 pct), due to the less lost repair time, and (2) the investment in equipment is less.

During the war, this electric furnace was in continuous operation, melting rimmed, semi-killed and killed carbon steels on a 24-hr per day basis for a period of 3 yr. Operating costs have compared very favorably with costs of producing comparable steels in openhearth furnaces also in continuous operation due to the pressure of war demands. The overhead cost of the electric unit is lower, the charge is cheaper and the relining costs are less per ton of steel produced. The average costs have varied from 75¢ to \$1.00 per ton, above or below cost of production in the openhearth, depending on conditions. To date, the electric furnace has served to supplement the output of 13 openhearths.

Converting Surplus Presses by Arcwelding

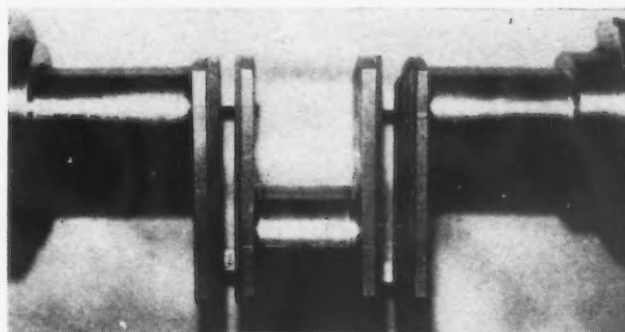
LACK of punch presses threatened serious production holdups at the plant of the United Refrigerator Co., Hudson, Wis., until an ingenious expedient was suggested by R. E. Williams, welding engineer for Lincoln Electric Co. A number of 18 ton Bliss presses were available from WAA as surplus, but these were built for a 6-in. stroke, whereas the company required only a 2-in. stroke for their particular application. The suggestion was made that the stroke could be changed by arcwelding, and the WAA machines were purchased.

The first step in the conversion was to remove the crankshaft, clamp it in a fixture, and cut through the crankcheeks with a DoALL saw as shown in fig. 1. While still in the same fixture, the shaft was transferred to a milling machine and an open, approximately 30° V was machined on each side. The parts were then set up on a face plate, and the crankpin moved up the necessary 2 in. to change the stroke from 6 in. to 2 in. In this position the cheeks were drilled, and pins inserted to hold the proper alignment.

The modified shaft was next put back into the press in its own bearings, and one welding pass was made with Stainweld A7 shielded arc electrode, $\frac{1}{8}$ -in. size, in the bottom of the grooves. The finish welding was performed with 5/32-in. Fleetweld 37 rods in 3 to 4 passes. All welding was done in the machine so that the bearings would keep the shaft straight, and was performed intermittently from one side to another. Care was exercised in the amount of weld metal laid in each pass, and in turning from side to side to keep contraction as equal as possible. How well this was done may be judged by the fact that although the machine was equipped with new bearings it was possible to turn the shaft by hand at all times from start to finish.

The final step was to remove the shaft and machine

off the surplus weld metal, producing a clean finished surface as shown in fig. 2. The remaining shafts were altered in the same way, and the various machines are now in operation at various United Refrigerator plants.



ABOVE

FIG. 1—Original crankshaft after cutting apart and milling V grooves.

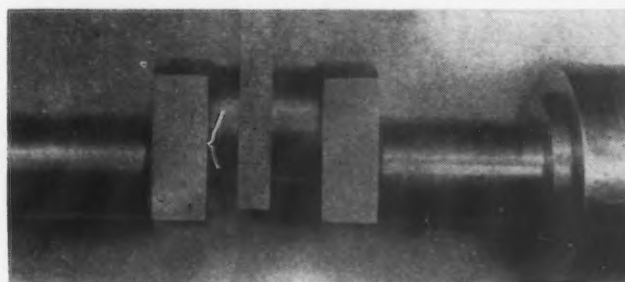
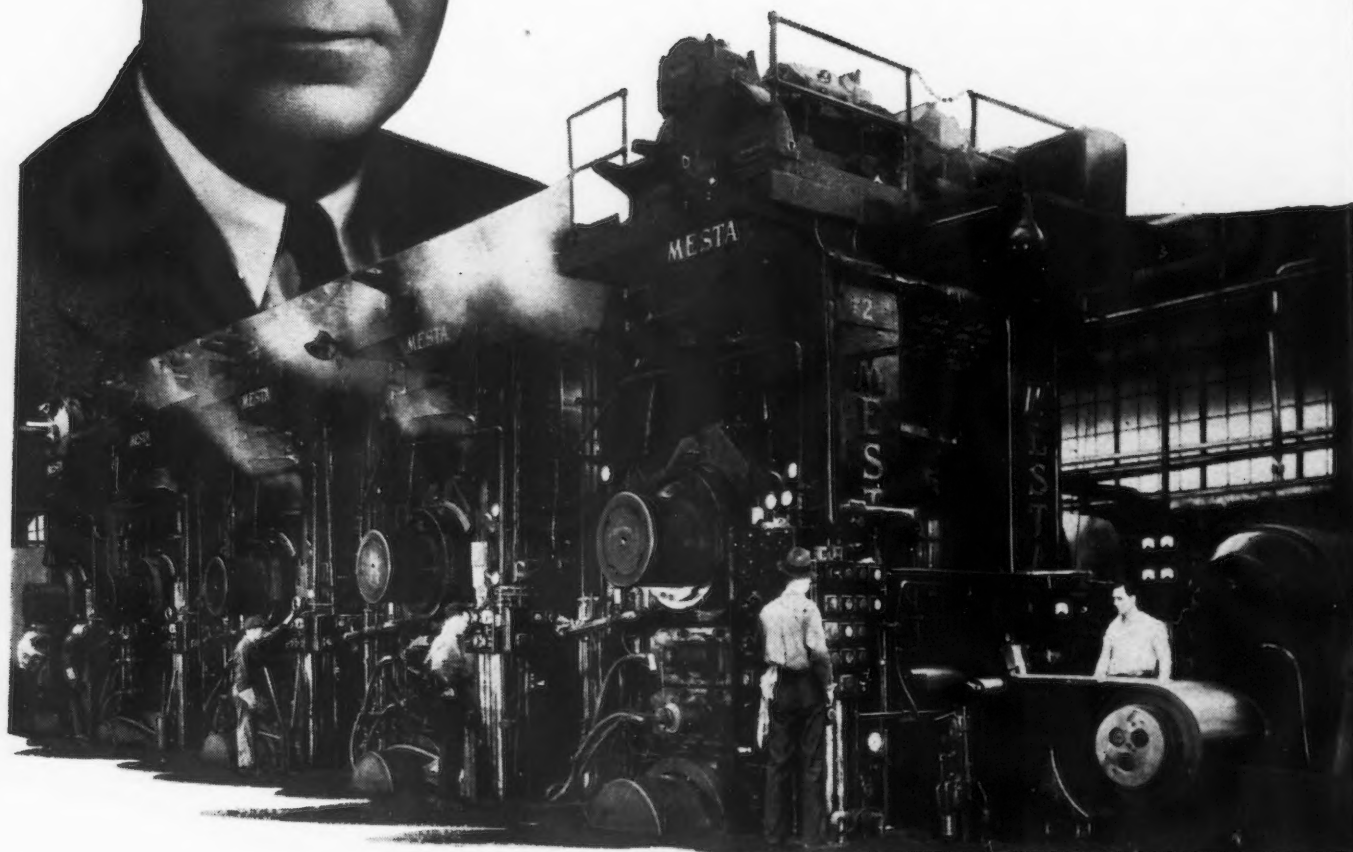


FIG. 2—Completely machined and finished shaft ready for installation in the press.



o o o
FREEMAN H. DYKE,
 president of the As-
 sociation of Iron and
 Steel Engineers, and
 assistant general man-
 ager, Wheeling Steel
 Corp., Steubenville,
 Ohio.
 o o o

Steel Mill



CUMULATED technological advances made by the nation's iron and steel engineers over the past five years will be disclosed at the equipment exhibit to be held by the Association of Iron and Steel Engineers at Cleveland, Oct. 1 to 4, in connection with the association's 1946 convention. This exposition, the association's first since 1941, will feature equipment exhibits by some 150 manufacturers and will represent, in many cases, the first public display of equipment developed during the war years. An unusual feature of the exposition will be a working model of a continuous butt-weld steel tube mill which will simulate every phase of commercial practice in producing butt-weld tubing.

Running concurrently with the equipment exhibition will be a heavy schedule of technical meetings and social functions. The technical sessions, listed in detail below, will cover 66 authors and chairmen who will discuss various phases of the production and processing of iron and steel.

The plans for this year's convention have been described by Freeman H. Dyke, AISE president and assistant general manager, Wheeling Steel Corp., Steubenville, Ohio, as "... bigger and better than ever before. The exposition, the first since 1941, will be bristling with the many developments of the past five years..." A detailed program of the technical meetings follows.

o o o
ALL technical meetings and the equipment exhibition, which feature the 1946 annual convention of the Association of Iron and Steel Engineers, will be held at the Cleveland public auditorium. Social functions, as noted in the following program, will be held at the Statler Hotel, Cleveland. The equipment exhibition will be open from 10 a.m. to 10 p.m. on Tuesday and Wednesday. On Thursday the hours will be from 10 a.m. to 5:30 p.m. and on Friday from 10 a.m. to 4 p.m.

Tuesday, Oct. 1

9:00 A. M.

Registration.

9:15 A. M.

Business meeting—Conducted by F. H. Dyke, president AISE.

9:30 A. M.

Electrical Session—Chairmen: F. W. Cramer, Carnegie-Illinois Steel Corp., and V. E. Schlossberg, Inland Steel Co.

"Gearing for Steel Mill Auxiliaries and Cranes," by L. J. Collins, General Electric Co.

Discussion of Mill Type Motor Rat-

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Engineers

Will hold first postwar convention and exposition in Cleveland, Oct. 1 to 4



ings, by Frank Cramer, Carnegie-Illinois Steel Corp.
Standardization committee reports, by chairmen of various subcommittees.

2:00 P. M.

Operating Practice Session—Chairmen: C. L. McGranahan, Jones & Laughlin Steel Corp., and J. L. Tatman, Wheeling Steel Corp.

"Scale Removal and Surface Preparation by Reduction with Sodium Hydride," by H. L. Alexander, E. I. du Pont de Nemours & Co.

"Roller Leveling and Processing of Flat Rolled Products," by A. J. Wardle, Jr., McKay Machine Co.

"Corrugating of Sheet Metal," by Joseph E. Kiefer, Streine Tool & Mfg. Co.

2:00 P. M.

Combustion Session—Chairmen: P. F. Kinyoun, Bethlehem Steel Co., and E. C. Hite, Timken Roller Bearing Co.

"Heating and Melting Furnace Controls," by C. G. Bigelow, Jr., Loftus Engineering Corp.

"Economics of High Pressure Steam for Steel Plant Power," by F. A. Sawyer, Stone & Webster Engineering Corp.

"Heat Problems in the Steel Industry," by Victor Paschkis, Columbia University.

10:00 P. M.

Exhibitors' Dance, Euclid Ballroom, Hotel Statler.

Wednesday, Oct. 2

9:00 A. M.

Safety Symposium—Chairmen: R. H. Ferguson, Republic Steel Corp., and James Farrington, Wheeling Steel Corp.

"Industrial Health Problems in the Steel Industry," by J. William Fehnel, Metropolitan Life Insurance Co.

"Recommended Practice in Connection with Fire Prevention and Safety in Byproduct and Benzol Plants," by R. W. Schirmer, Hendricks Engineering Corp.

"Suggested Methods Which May Be Used to Prevent Accidents from Asphyxiation and Explosions of Various Types of Gases," by J. M. Lewis Mine Safety Appliance Co.

12:15 P. M.

Old Timers' Luncheon.

2:00 P. M.

Electrical Session—Chairmen: E. L. Anderson, Bethlehem Steel Co., and M. B. Antrim, Lukens Steel Co.

"Latest Trends in Commutation," by Leon D. Cook, Commonwealth Edison Co.

"Comparison of AC and DC Power Distribution," by G. A. Kaufman, Jones & Laughlin Steel Corp.

"Spot Conversion for Adjustable Speed Drives," by R. A. Geuder and W. R. Hough, Reliance Electric & Engineering Co.

2:00 P. M.

Combustion Session—Chairmen: C. J. Wyrough, Jones & Laughlin Steel Corp., and H. S. Hall, Lukens Steel Co.

"Submerged Combustion in Industry," by W. G. See, Submerged Combustion Co. of America.

"Recent Improvements in Cover Annealing," by A. J. Fisher, Bethlehem Steel Co.

"A New Method of Strip Coil Annealing," by H. H. Armstrong and F. F. Schlitt, Lee Wilson Engineering Co., Inc.

Thursday, Oct. 3

9:00 A. M.

Electrical Session—Chairmen: I. N. Tull, Republic Steel Corp., and A. D. Howry, Alan Wood Steel Co.

"Electrical Equipment for the Sendzimir Cold Strip Mill," by H. W. Poole, General Electric Co.

"Schemes and Methods for the Control of Plugging," by E. J. Posselt, Cutler-Hammer, Inc.

"Power and Power Factor in Arc Furnace Operation," by Earle H. Browning, Westinghouse Electric Corp.

9:00 A. M.

Lubrication Session—Chairmen: C. E. Pritchard, Republic Steel Corp., and C. R. Hand, Bethlehem Steel Co.

"Surface Activity of Lubricants," by J. M. Wilson, Shell Oil Co., Inc.

"Analysis of Centralized Lubricating Systems," by J. P. Gravenstreter, Carnegie-Illinois Steel Corp.

"Rust Preventive Compounds," by H. Carpenter, Standard Oil Co. of New Jersey.

2:00 P. M.

Mechanical Session—Chairmen: L. J. Gould, Bethlehem Steel Co., and T. R. Moxley, Wheeling Steel Corp.

"Automatic Welding in Steel Plant Maintenance," by H. E. Holman, Jones & Laughlin Steel Corp.

"Storage Yard Material Handling," by Frank C. Wier, Timken Roller Bearing Co.

"Scheduling of Maintenance Shops," by L. E. Fuller, Jr., Carnegie-Illinois Steel Corp.

2:00 P. M.

Combustion Session—Chairmen: E. C. McDonald, Republic Steel Corp., and B. B. Bargman, Carnegie-Illinois Steel Corp.

"Improved Design of Metallic Recuperator," by Frank D. Hazen, Hazen Engineering Co.

"Relation of Refractory Economy to Combustion in Steel Mill Furnaces," by Edwin N. Hower, Carnegie-Illinois Steel Corp.

"Heating Rate Tests of Slab Reheating Furnaces," by J. W. Percy, U. S. Steel Corp.

7:30 P. M.

Formal Dinner-Dance, Grand Ballroom, Hotel Statler.

Friday, Oct. 4

9:00 A. M.

Operating Practice Session—Chairmen: W. H. Collison, Great Lakes

Steel Corp., and J. B. Hill, Bethlehem Steel Co.

"Iron Ore Reserves of the Mesabi Range," by E. W. Davis, University of Minnesota.

"The Chemical Removal of Scale, Sludges and Oxides from Blast Furnace and Allied Steel Mill Equipment," by B. H. McDaniel, Dowell, Inc.

"The Manufacture of Oxygen in Large Quantities for Industrial Uses," by Martin J. Conway, consulting engineer.

2:00 P. M.

Rolling Mill Session—Chairmen: Alex Montgomery, Jr., Carnegie-Illinois Steel Corp., and Louis Moses, Bethlehem Steel Co.

"Modern Seamless Tube Mills," by William Rodder, Aetna-Standard Engineering Co.

"The Use of Tension in Sizing Small Diameter Seamless Pipe and Tubing," by S. W. Stouffer, National Tube Co.

"Rod Mills and Rod Mill Roll Design," by Ross E. Beynon, Carnegie-Illinois Steel Corp.

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2:00 P. M.

Soluble Oils Symposium—Chairmen: D. N. Evans, Inland Steel Co., and R. A. Barta, Republic Steel Corp.

"Quenching and Processing," by Steven Smith, Air Reduction Sales Co.

"Cold Reduction of Strip," by J. R. Powell, Jones & Laughlin Steel Corp., and R. W. Piper, Apex Alkali Products Co.

"Cutting and Grinding," by C. M. Larson, Sinclair Refining Co.

"Bacterial Deterioration," by L. Lib-
erthson, L. Sonneborn Sons, Inc.

Exhibitors at the 1946 AISE Iron and Steel Exposition

A

Air Reduction Sales Co.
Booths 100, 101, 102, 103

Allen-Bradley Co.
Booths 308, 309

Allis-Chalmers Mfg. Co.
Booths 33, 34, 35, 36, 37

Aluminum Co. of America
Booths 262, 263

American Car & Foundry Co.
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Amsler-Morton Div., Union Industries, Inc.
Booth 317

Askania Regulator Co.
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Automatic Transportation Co.
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B

Bailey Meter Co.
Booths 274, 275

Baker-Raulang Co.
Booths 1, 2, 3

Bantam Bearings Div., Torrington Co.
Booth 318

Barrett-Cravens Co.
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Blaw-Knox Co.
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Booths 314, 315, 316

Buckeye Laboratories Corp.
Booths 117, 118

Burndy Engineering Co., Inc.
Booths 138, 139

C

Carbone Corp.
Booth 273

Clark Controller Co.
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Cleveland Crane & Engineering Co.
Booths 50, 51, 52, 53, 54, 55

Cleveland Worm & Gear Co.
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Crocker-Wheeler Div., Joshua Hendy Iron Works—Booths 242, 243

Crouse-Hinds Co.
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Cutler-Hammer, Inc.
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D

De Laval Separator Co.
Booth 344

Joseph Dixon Crucible Co.
Booth 119

Dougherty Lumber Co.
Booths 68, 69

E

Thomas A. Edison, Inc.
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Electric Controller & Mfg. Co.
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Electric Products Co.
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Electric Service Mfg. Co.
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Electric Storage Battery Co.
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Electro Chemical Process Div., Blaw-Knox Co.
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Eutectic Welding Alloys Corp.
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F

Farval Corp.
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Federal Electric Products Co., Inc.
Booths 25, 26, 27

Forker Corp.
Booths 218, 219, 220, 221, 222, 223

Furnace Engineers, Inc.
Booths 284, 285

G

Garlock Packing Co.
Booths 6, 7

General Allied Metals Co.
Booth 327

General Electric Co., Bridgeport Div.
Booth 147

General Electric Co.
Booths 278, 279, 280, 281

Gordon Lubricator Div., Blaw-Knox Co.
Booths 276, 277

Gould Storage Battery Co.
Booth 24

H

Heil Process Equipment Corp.
Booth 310

Hodson Corp.
Booths 259, 260

Holophane Co., Inc.
Booth 48

Homestead Valve Mfg. Co., Inc.
Booths 264, 265

C. B. Hunt & Son, Inc.
Booths 40, 41

Hyatt Bearings Div., General Motors Corp.
Booths 286, 287

Hydropress, Inc.
Booth 252

I

Ideal Industries, Inc.
Booths 268, 269

Industrial Heating
Booth 216

International Nickel Co., Inc.
Booth 236

THE IRON AGE
Booths 348, 349

I-T-E Circuit Breaker Co.
Booths 240, 241

J-K

Jefferson Electric Co.
Booth 253

Kennametal, Inc.
Booth 148

Keystone Lubricating Co.
Booth 201

Koppers Co., Inc.
Booths 306, 307

L

Lewis Foundry & Machine Div., Blaw-Knox Co.—Booths 276, 277

Lincoln Engineering Co.
Booths 290, 291

Linde Air Products Co.
Booths 80, 81, 82

Lintern Corp.
Booth 85

Lovejoy Flexible Coupling Co.
Booth 23

M

Mackintosh-Hemphill Co.

Booths 209, 210

Markal Co.

Booth 247

Mesta Machine Co.

Booths 288, 289, 304, 305

Mine Safety Appliances Co.

Booths 282, 283

Morganite Brush Co.

Booth 202

D. J. Murray Mfg. Co.

Booth 252

N

National Alloy Steel Div., Blaw-Knox Co.

Booths 276, 277

National Carbon Co., Inc.

Booths 78, 79

O

Ohio Electric Mfg. Co.

Booth 237

Okonite Co.

Booth 303

Otis Elevator Co.

Booth 261

Owens-Corning Fiberglas Corp.

Booths 230, 231, 232

P

Pennsylvania Industrial Engineers Div.,

Union Industries, Inc.—Booth 317

Penton Publishing Co.

Booths 311, 312

Philco Corp.

Booth 96

Pittsburgh Rolls Div., Blaw-Knox Co.

Booths 276, 277

Post-Glover Electric Co.
Booth 77

Powermatic Ventilator Co.
Booths 350, 351

Progressive Systems, Inc.
Booth 8

Pyle-National Co.
Booth 22

R

Ready-Power Co.

Booths 4, 5

Reliance Electric & Engineering Co.

Booths 44, 45, 60, 61, 76

Rockbestos Products Corp.
Booth 56

S

Safety Clothing & Equipment Co.
Booth 319

Salem Engineering Co.
Booth 235

Shell Oil Co., Inc.
Booths 353, 354

SKF Industries, Inc.
Booths 71, 72

Socony-Vacuum Oil Co., Inc.
Booths 266, 267

South Bend Lathe Works
Booths 9, 10

Speer Carbon Co.
Booth 270

Square D Co.
Booths 73, 74, 75

Steel Publications
Booth 254

Stewart-Warner Corp.
Booths 248, 249

Superior Carbon Products, Inc.
Booth 302

T

Texas Co.

Booths 342, 343

Thomas & Betts Co., Inc.

Booths 323, 324

Thompson Electric Co.

Booths 42, 43

Thomson Industries, Inc.

Booth 322

Tide Water Associated Oil Co.

Booths 108, 109

Timken Roller Bearing Co.

Booths 104, 105, 106, 107

Tool Steel Gear and Pinion Co.

Booths 238, 239

Trabon Engineering Corp.

Booths 28, 29

Truffo Fan Co.

Booth 62

Trumbull Electric Mfg. Co.

Booth 234

U-V

Union Carbide and Carbon Co.

Booths 80, 81, 82

Union Steel Castings Div., Blaw-Knox Co.

Booths 276, 277

Vacuum Conveyor Co.

Booth 149

W-Y

Wagner Electric Corp.

Booths 203, 204, 205

Waldes Koh-I-Noor, Inc.

Booths 224, 225

John Waldron Corp.

Booth 292

Wellman Engineering Co.

Booth 233

Yale & Towne Mfg. Co.

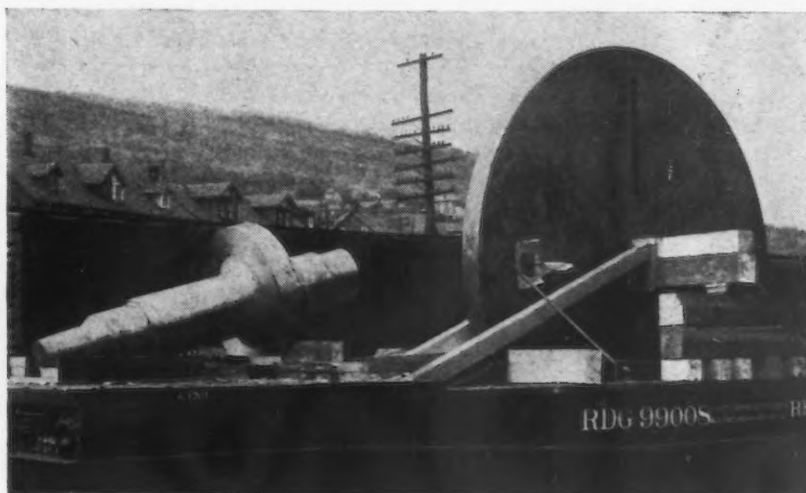
Booths 211, 212, 214, 215, 226, 227, 228, 229

Massive Forgings For Pulp Mill Machinery

FOUR large chipper disks, for breaking down logs into chips in Pacific Coast pulp mills, have recently been completed at the Bethlehem plant of Bethlehem Steel Co. The disks, one of which is shown in the accompanying illustration, largest of their type ever made, are 175 in. in diam, 10 in. thick, and weigh over 32 tons each. One of them, which has already been placed in operation, is capable of reducing a log, 24 ft long and 4 ft in diam, into chips of $\frac{3}{4}$ in., or under in less than half a minute.

The disks were forged from an ingot weighing 185,000 lb. Forging was carried out under a 7500-ton hydraulic press forge. The rough forging, measuring 180 in. square and 12 in. in thickness, was flame-cut to approximate dimensions with a hole in the center for the arbor. The arbor was forged under the same 7500-ton press as used for the disc. The

rough forging was heat-treated by normalizing and annealing, after which it was rough machined with sufficient allowance for finishing. The piece weighed approximately 6 tons and measured 112 in. overall, with a large flange of 48 in. diam.



Test Bar Data

V.

Casting Properties

To provide a guide to engineers in assessing the strength requirements of Meehanite castings of various designs and sections, the author herein explains the reasons why the tensile properties obtained from the 1.2-in. arbitration bar are misleading when an attempt is made to apply the data to castings of greater dimensions. The significance of solidify penetration power is also described.

MUCH has been written on the tensile test bar machined from the standard arbitration bar and the application of the data obtained as an index of the tensile strength of the casting. Two factors, however, enter into the analysis and discussion of the usefulness of this procedure.

The first concerns the preparation of the base arbitration bar, as regards methods of molding and pouring, care in machining, threading and pulling in the tensile machine. The second consideration relates to the real significance of the test result as a measure of the property of the casting.

While the first matter cannot be treated at great length here¹ it is assumed in this article that the

¹ "What About Your Test Bars?" Foundry, May 1945, p. 84.

tensile strength as revealed by the bar machined from the arbitration bar gives a true picture of the property of the iron. Accordingly attention will be directed to the significance of this value as a measure of the tensile property of the casting, particularly in relation to various sections of a casting which may exhibit profound variations in cross-sectional dimensions or cross-sectional area.

In cast irons it is common knowledge that the tensile test results obtained on a test bar cut from the standard 1.2-in. diam arbitration bar may be quite different from the results obtained if a bar is cut out of the casting. This discrepancy is particularly true where dissimilarity of section between arbitration bar and casting is considerable. As the discrepancy increases the dimensional differences increases.

The reason for this is quite simple. In cast irons the property of the metal is a direct function of the

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Director of Research, Meehanite Metal Corp.
New Rochelle, N. Y.

rate of cooling. In general the more rapid the cooling the smaller will be the graphite flake distribution and the closer or more dense the iron. This fact is well demonstrated in the comparison of the fracture of a gray iron cast in varying sectional dimensions. In small sections the iron is relatively dense and strong. If the section is thin the rapid rate of cooling may result in a white or at least a mottled structure.

Efforts have been made to counteract these differences, resulting from variations in cooling rate dependent on section, by adjustment of the chemistry of the casting. Thus, as the sections become smaller, an increase in carbon and/or silicon content aids in preventing the formation of a white or mottled iron.

Efforts to Overcome Test Discrepancies

The American Society of Testing Materials has tried fairly successfully to overcome the difficulty of variation in cooling rate between arbitration test bar and casting by having test bars of different sizes. These are intended to cover different ranges of casting thickness and many or relatively light castings.

However, the largest bar has a 2-in. diam and

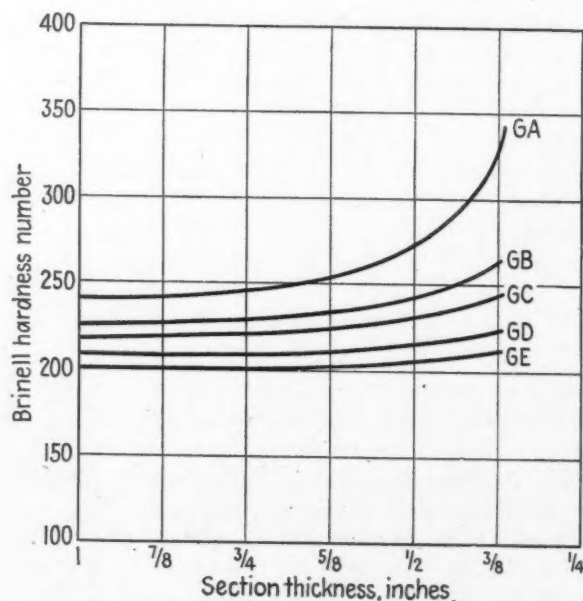


FIG. 1—Effect of progressive reduction of casting section on hardness for various engineering types of Meehanite.

very few companies are equipped with testing machines adequate to handle bars over 1.2-in. diam. Accordingly incorrect results are produced, because the material finally tested comes from the center of the cast iron bar and is thus coarse in structure and unrepresentative.

Moreover even the large diameter bar takes no account of the mass or design of the casting, and unless some allowance for this is estimated, the consideration of section thickness alone can be misleading.

These factors have been recognized in Meehanite castings.

Two diagrams will illustrate the general relation of hardness to section and of tensile strength to section of the five engineering types Meehanite GA, GB, GC, GD, and GE. The tensile strengths, and hard-

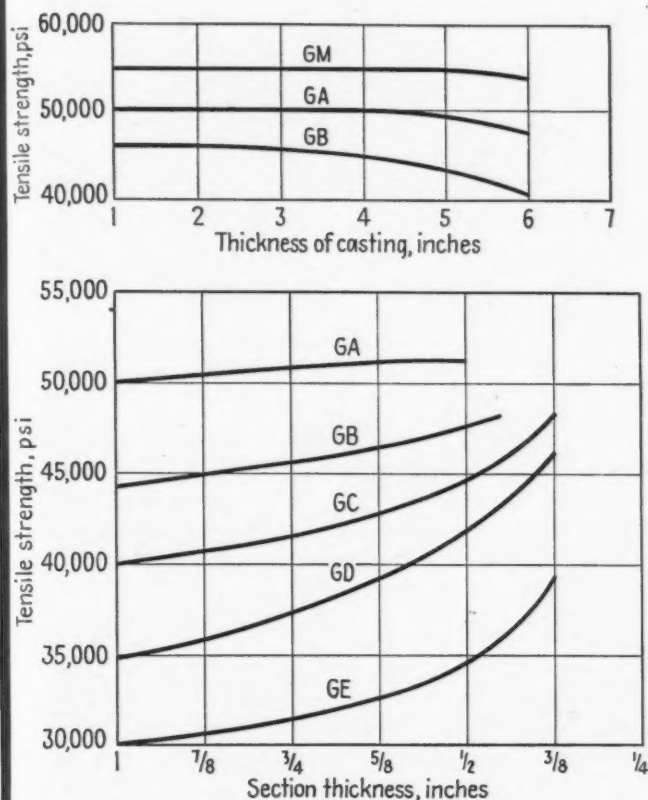


FIG. 2—Effect of progress reduction and increase in casting section on the tensile strength of Meehanite types.

nesses of these materials are given in table I. The hardness relation for type GA Meehanite as a function of dimension can be observed in fig. 1. This type is cast into molds for the production of castings of $\frac{5}{8}$ in. and greater for general engineering purposes. If a casting of only $\frac{3}{8}$ in. or less is made of this iron a hardness of 350 Bhn or greater would result and the casting would be difficult to machine.

On the other hand, as the sectional dimension decreases in the case of types GD and GE Meehanite, the strength properties increase but machining is little affected.

The significance of the proper selection of iron in relation to tensile strength is illustrated in fig. 2. In ordinary sections, comparable to the standard arbitration bar the tensile strength of GA and GD Meehanite, for example, are 50,000 psi and 35,000

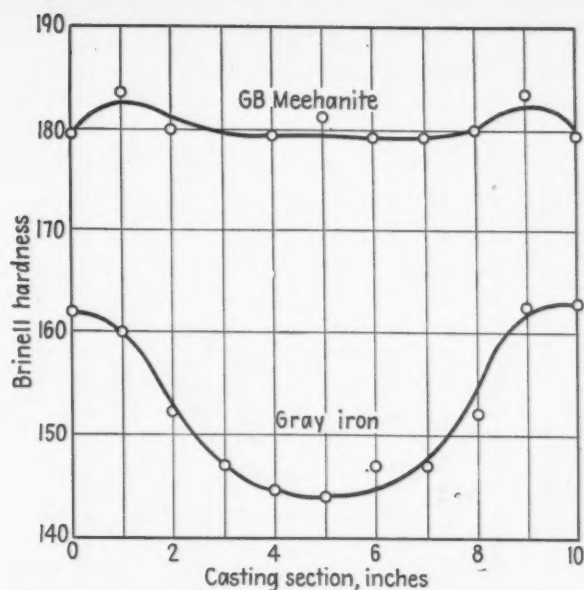


FIG. 3—Brinell hardness across a 10-in. section of GB Meehanite compared with that of gray iron.

psi respectively. A light casting of $\frac{3}{8}$ in. made in type GA Meehanite will have no loss of strength but the hardness will increase in the manner already shown with resultant lack of toughness and machinability.

If type GD Meehanite is used for the thin castings then good machinability and toughness are retained while the tensile, in such light sections, may approximate 50,000 psi.

In light castings the problem of maintaining strength is not a serious one and a suitable iron can be selected from a study of little more than the data already given in figs. 1 and 2. However, it is not possible in this article to discuss fully the technological details and developments inherent in the control of the properties of heavy castings. It must suffice to state that it is related to constitution of the iron as prepared in the melting furnace prior to the casting of the iron in the mold.

It has been discovered that there is a direct relation between the constitution of the iron and the thickness of the casting to be made and that it is possible to establish a ratio between constitutional process values in each casting which will insure uniformly dense sections and predetermined engineering properties.

The results of this control are well typified in table II which is representative of the principles indicated for one type of Meehanite casting. The actual values of Brinell hardness taken across a transverse section of a 10-in. billet cast in type GB Meehanite and in ordinary gray iron are shown in fig. 3. This

TABLE I

Nominal Tensile Strength and Brinell Hardness Values of the Various Engineering Types of Meehanite.

Type of Meehanite.....	GA	GB	GC	GD	GE
Specified Tensile, Psi.....	50,000	45,000	40,000	35,000	30,000
Minimum Nominal Hardness, Bhn.....	207	196	192	183	174

TABLE II
Effect of Control of Constitution in Relation to Casting Dimension for One Meehanite Type

Section of Casting in In.	Tensile Strength, Psi
1.25	53,600
2.00	53,900
3.00	52,850
4.00	54,650
6.00	47,250

TABLE III
Role of Solidity Penetration Power in Relation to the Engineering Meehanites

Meehanite Type	TC-SI	Specific Gravity	Volume of Graphite	S.P.P. In.	Nominal Tensile Psi	Modulus of Elasticity In Millions
GM	4 -4.2	7.34	7.3	6	55,000	23
GA	4.2-4.4	7.31	7.5	5	50,000	21
GB	4.4-4.6	7.28	7.8	4	45,000	19
GC	4.6-4.8	7.25	8.4	2 1/2	40,000	17
GD	4.8-5.0	7.22	9.2	1 1/2	35,000	15
GE	5.0-5.4	7.16	10.5	3/4	30,000	12

TABLE IV
Tensile Data for GB and GD Meehanite Castings of Small and Large Section

Cast Section, In.	GB Meehanite Tensile	GD Meehanite Tensile
3/4		40,300
1	51,500	35,800
1 1/4	49,300	35,800
1 1/2	51,500	33,600
1 3/4	49,300	33,600
2	42,600	31,400
3	42,600	26,900

TABLE V
Tensile Strength Data Obtained from Sections Cut from Various Parts of a Turbine Casing Casting. Type GE Meehanite Nominal 30,000 psi

Bar No.	Location on Casting	Location in Mold	Section Thickness, In.	Tensile, Psi
2	Outer Wall	Bottom Portion	1 1/4	28,000
3	Exhaust Wall	Center	1 1/16	28,900
4	Flange	Extreme Top	2 7/8	25,300
5	Exhaust Flange	Bottom Portion	3	26,200
6	Rib over Bearing	Center	1 3/4	26,400
7	Flange	Extreme Bottom	5 1/2	26,300
8	Exhaust Flange	Top Portion	3 7/8	27,300
9	Body Flange	Center	2 1/8	27,600
10	Flange	Extreme Top	2 1/2	29,300
11	Center Dividing Rib	Center	1 1/2	28,200
12	End Wall	Top Portion	1 1/2	28,200
13	Center Dividing Rib	Extreme Bottom	1 7/16	25,500
14	Internal Rib (Brg)	Bottom Portion	1 1/8	26,000
15	Flange on Foot	Center	2 1/4	26,400

diagram emphasizes the characteristics under discussion.

When adequate control of constitution of the iron is not exercised then marked differences in properties of the metal may be observed in different parts of the casting. These differences are related to mass effect and cooling rate as indicated previously. The variations have been ascribed to what has conveniently been termed "solidity penetration" power.

This factor of solidity penetration power has been determined in Meehanite practice, and while control is maintained primarily by attention to the many variables obtaining in charging and in furnace operation, the chemistry of the iron also plays a role in the problem.

An effort has been made to provide a general picture of these ideas from the data included in table III. Referring to the data for type GA Meehanite alone, it can be concluded that completely effective solidity penetration can be effected up to a depth of 4 in. inward from the wall of the mold. This means that essentially uniform characteristics can be ob-

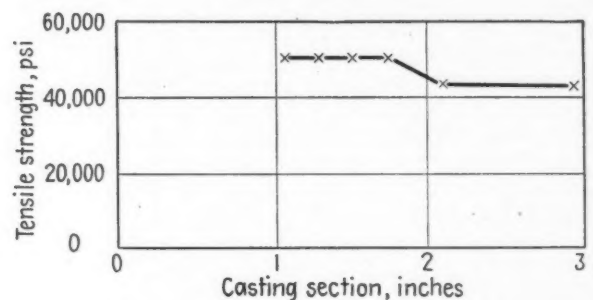


FIG. 4—Tensile strength of different section bars of GB Meehanite of correct constitution.

tained in such castings up to a minimum of 10 in. total thickness when the constitution of the iron is adjusted correctly to casting dimensions.

Test Bars Inadequate for All Casting Types

From these general observations it should now be clear that while a 1.2-in. standard arbitration bar does serve to provide properties comparable with those of a casting of similar dimensions, it cannot furnish similar data for metal poured into castings having profound dimensional differences.

This is well brought out in some data obtained on types GB and GD Meehanite. In each of the two instances the constitution of the iron was not adapted to any particular casting section, but was poured from a single ladle into sections ranging from 3/4 to 3 in. Tensile data are included in table IV. These figures illustrate that values higher than the nominal 45,000 psi for type GB and 35,000 psi for type GD Meehanite can be anticipated in small sections (See fig. 2), but that for heavier sections solidity penetration power begins to be the controlling factor. For optimum engineering properties type GB Meehanite of suitable constitution is limited to sections of approximately 6 in. while type GD Meehanite is limited to sections not exceeding about 3 in.

There are, of course, many instances where the maintenance of maximum strength properties throughout the complete section of a casting are not called for in which case this analysis is not applicable.

A typical instance is shown in table V where ten-

sile values were taken from various sections of a large turbine casing. In general this would be specified in gray cast iron but in this case it was made in type GE Meehanite with a specified tensile of 30,000 psi. It will be noted that the sectional dimensions in this casting in many places exceeds the limiting solidity penetration power and the tensile correspondingly falls. Graphs of the values given in table IV are shown in figs. 4 and 5 respectively.

If, for example, a casting of 6 or 8-in. dimension has to be poured in GA Meehanite because of the slow rate of solidification, the metal has to have a constitution suitable for that section in order that solidity penetration may be effective in maintaining the necessary engineering properties. When such iron is poured in the standard arbitration bar the rate of cooling is much too high for the particular iron under consideration and an iron conditioned for heavy sections may well give a mottled to white structure in the 1.2-in. bar.

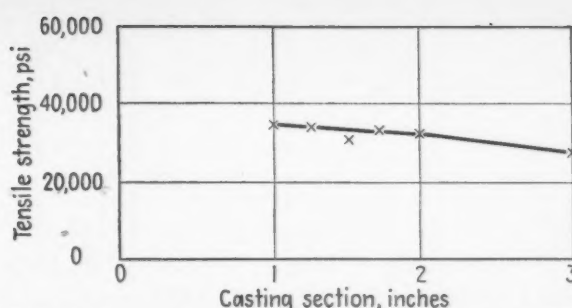


FIG. 5—Tensile strength of different section bars of GD Meehanite of correct constitution.

It is of profound importance to the engineer to recognize the new basic metallurgical controls which are now available and he must begin to direct his attention more closely to these developments in metallurgy technology if he is to apply successfully the materials now within his grasp.

Hydraulic Spacer Replaces Drill Jigs

PINPOINT precision in the drilling of holes in metal parts without the use of jigs, and at a saving in time of 20 pct or better, is now reported possible through a device which has passed exhaustive tests at the Bullard Co., Bridgeport, Conn.

Called the Man-Au-Trol Spacer, this unit consists of a heavy flat table, which moves either laterally or longitudinally on its base under an accurate drill spindle fixed rigidly in one position. With the work clamped in place, the table is hydraulically traversed from one predetermined position to another by means of two selector controls; one for lateral positions, the other for locating longitudinal positions.

The setting of the selector dial by the operator determines which one of a number of cylinders is to receive the hydraulic pressure. A piston in the cylinder reacts to the thrust of the pressure, thereby moving the table. Motion continues until the piston reaches a positive stop. The position of this stop may be varied and selected through screw adjustment. Once the stops have been set, the work-carrying table will return to them with extreme accuracy.

There is one hydraulic cylinder for each longitudinal and transverse motion. Thus, if ten cylinders were provided for each of the two directions, there would be 100 positions available. Force from a balanced master cylinder, working in conjunction with the force of any active cylinder, provides a rapid but smooth motion from one location to another and locks the table against its stop.

To demonstrate the Man-Au-Trol Spacer's accuracy, Bullard officials set it to drill a pattern of four holes in a $\frac{5}{8}$ -in. thick square of steel. With one piece finished, the same pattern was drilled independently in another piece of steel of the same size. One steel plate was placed on top of the other and four steel pins, superfinished to a diameter about 0.0005 in. less than the holes, were inserted. The holes in both pieces matched perfectly.

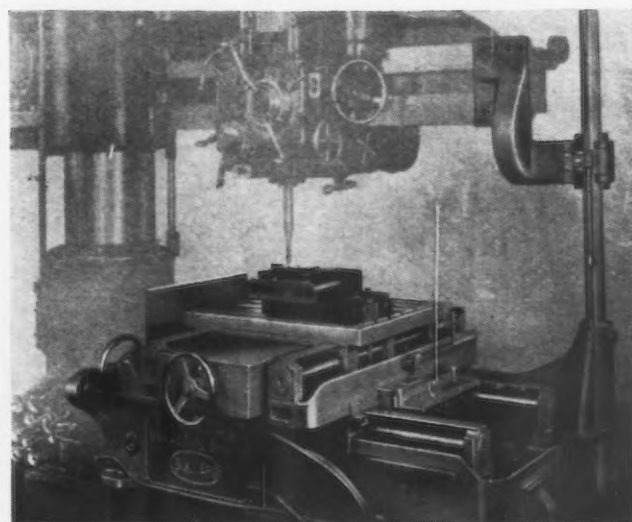
Tremendous economies which the Man-Au-Trol Spacer is said to make possible were shown in drilling, reaming, counterboring and tapping operations of parts for Bullard machine tools. One lot of 74 pieces customarily required more than 70 hr for drilling, using a jig. Use of the Man-Au-Trol Spacer saved better than 10 hr. The jig, now scrapped, cost close

to \$350 to fabricate. Another piece, put through in a lot of 134, would ordinarily have required 20 hr. On the Man-Au-Trol Spacer 4 hr were saved and the cost of producing the jig—\$75.00—was eliminated. Setup times were included in calculating the results of all tests.

Bullard engineers attribute these savings to a number of measureable causes. It is difficult, for example, to maneuver the spindle of a radial drill accurately over a hole previously drilled. As a result, the operator customarily changes tools to complete all work on a hole while the spindle is in place. However, the Man-Au-Trol Spacer will move the work to a great number of predetermined positions with precision, and make it possible for the operator to use one drill, for instance, until all its work is done before changing to the tap or other tool required to finish the operation.

Where the new device will end the use of drill jigs, the high cost of designing and fabricating them will be gone, and Bullard estimates that about \$500,000 worth of jigs and special tools in their own plant will now become scrap.

The experience of several months has shown that where the Man-Au-Trol Spacer replaced jigs, there have been no instances of spacing errors greater than permissible tolerances.



... A Critical Survey of

THE advent of each new atmosphere has resulted in a number of adherents. Obviously, if all shops tried to change their equipment to conform with each idea in turn, chaos would predominate. No such thought is here advanced. However, a basic understanding of the more significant laws governing atmosphere reactions with various types of steel should be classified, and in their light a review of the true governing characteristics of each atmosphere type be undertaken.

At present, due to improper correlation of information, each large heat treating atmosphere control installation is tailored to conform with particular requirements as seen by heat treaters involved. The

This is the second part of a three-part article. In the first part (THE IRON AGE, Sept. 19, 1946), the authors introduced a code system for identification of the various types of atmospheres. In a subsequent issue, the theoretical aspects of the subject will be further discussed.

result has been that identical treatments of a given grade of steel in essentially similar furnaces, for equal times at equal temperatures, have been done in widely varying, sometimes conflicting, atmosphere types. If all factors of a given installation are controlled, if temperatures are reliably reported, construction of furnaces reasonably free of leaks, lines tight, control instruments and indicating or analysis instruments accurate, then a given treatment for a given steel should always require essentially the same type of atmosphere. In the light of complete understanding of the chemistry of all pertaining factors, other than this cannot be true.

If an atmosphere producer is operated at an adjustment other than that which should be correct for a given treatment, either the results obtained will not be those anticipated, or some reaction has occurred in

the furnace or auxiliary equipment which has changed the true chemistry of the control gas.

Three graphs, figs. 1, 2 and 3, are presented to assist in visual clarification of the composition ranges shown in table I (see first part of this series). No single graph can possibly show all of the various compositions of unmodified combustion products which may be prepared from the many available fuel gases. Table V lists the more important commercially available industrial gases and their nominal compositions as prepared by the American Gas Assn. Considering the wide variations shown in them, in conjunction with such other unlisted fuels as butane and propane, it is obvious that the possible gases produced by the various stages of combustion and cracking cannot be presented on only one graph. Fig. 1 shows a combustion-cracking analysis graph for the range of unmodified atmospheres which can be generated from a 1000 Btu gas of a given composition. It illustrates the respective relationships of the four basic atmosphere classes formed from fuels. Fig. 2 represents the unmodified composition of dissociated NH_3 through partial and total combustion, and as only one fuel of known composition is used, one chart covers all of group II. Of the three atmospheres listed in group III only class 10 can be shown in graph form. Fig. 3 shows the range of composition of unmodified charcoal-generated atmospheres. It can readily be seen that class 10 atmospheres can vary quite widely and be most unfavorable in their reaction with various grades of steel, and that even in the most favorable adjustment, appreciable CO_2 and H_2O , plus low amounts of H_2 and high relative amounts of CH_4 are unfavorable aspects of such atmospheres.

The intense search for neutral atmospheres has been an outgrowth of the continual failure of atmospheres such as classes 3, 4 and 5 to produce freedom from

TABLE V
Percentage Analysis of Constituents in Industrial Fuel Gases*

Combustible Constituent	Type of Industrial Fuel Gas						
	Blue Water-Gas	Carbureted Water-Gas	Coke-Oven Gas	Anthracite Producer Gas	Refinery Gas	Natural Gas, Wet Type	Natural Gas, Sweet Type
Methane.....	1.3	0.1	29.6	1.0	41.6	87.0	73.1
Ethane.....	0.0	1.3	1.3	0.0	19.2	4.1	23.8
Propane.....	0.0	0.3	0.1	0.0	17.0	2.6	0.0
Butane.....	0.0	0.0	0.02	0.0	8.5	0.0	0.0
Ethylene.....	0.0	6.7	2.5	0.0	4.0	2.0	0.0
Propylene.....	0.0	1.5	0.3	0.0	5.3	0.0	0.0
Benzene.....	0.0	1.3	0.6	0.0	0.0	0.0	0.0
Hydrogen.....	47.3	37.4	56.7	17.7	1.4	0.0	0.0
Carbon monoxide...	37.0	35.0	5.7	23.2	1.6	0.0	0.0

* Source—"City Gas for Special Atmospheres," by C. R. Cline and C. G. Segeler, American Gas Assn.
Balance to make 100 pct consists principally of noncombustibles such as N_2 , CO_2 and minor impurities such as mercaptans and nonvolatiles plus, some sulfur products.

Controlled Atmospheres

decarburization on the more critical steels. Class 10 atmosphere was advanced as being capable of treating steels in complete absence of either decarburization or carburization. In practice, however, none of the theoretically perfect atmospheres are capable of producing completely satisfactory controlled results.

During the recent war the inability to secure freedom from ultimate surface breakdown of metals in service was a source of extreme economic and metallurgical difficulty to manufacturers of ordnance and aircraft parts and instruments. Surface breakdown under high unit area loads in various components, which were theoretically hard enough to sustain the loading, resulted in loss of as much as 95 pct of many parts used in precision machines and instruments. For example, manufacturers of aircraft ordnance instruments found they were unable to bright harden finished rollers, rate disks, bearings, races and gears to eliminate susceptibility to scoring, grooving, flaking, spalling and other defects, which were ultimately traced to atmosphere failures.

In one series of instances the steel was subjected to the highest degree of inspection control and was heat-treated in the most carefully controlled cracked gas atmospheres, yet 90 to 95 pct of the parts produced were either scrapped or reworked due to a surface breakdown of a few hundred-thousandths of an inch—enough to ruin the surface accuracy required by the instruments. Most thorough metallurgical analysis did not disclose the true source of the surface destruction. Smear metal, arising from improper final grind operations was alleged; however, the most precise superfinishing operations did not eliminate the few tenths of soft metal. It was finally decided, even after adoption of SAE 52100 steel containing vanadium, to leave a few tenths on the part to be hardened, and to finish grind after hardening. However, this was at best a very wasteful method which resulted in loss of more than 70 pct from checking, cracking, spalling and surface distortion. No expedient was satisfactory in solving the problem. Hard chrome plating, nitriding, carburizing, nicarbing and all other likely hardening treatments were tried but all failed due to excessive distortion, flaking, spalling or residual surface softening.

The above condition has been encountered to some extent in all precision industries where the utmost care is taken in the hardening of precision parts, bearings, races, gears for instruments and the like. Many manufacturers, unable to harden finished parts properly, deliberately leave excess stock on the parts to be hardened and give them a final superfinish grind after hardening. The economic disadvantages of such methods are obvious. Life run tests on parts which have superficially soft skins, even as slight as a few hundred thousandths of an inch in depth, have demonstrated the totally disproportionate effect which this defect can have on precision high-speed bearings for instrument and other uses. High precision,

Basing their arguments on the basic chemical reactions which occur when controlled atmospheres are used, the authors take issue in this article with some popular present-day concepts regarding the functions of controlled atmospheres. A theory, attempting to set forth the probable mechanics of soot formation, is proposed, based on isotopic modifications of carbon. A detailed discussion of the effects of hydrogen is also presented.

o o o

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o o o

high-speed ball bearings for aircraft instruments which must be sealed with self-contained lubricant sources have been known to fail in less than 10 pct of the expected life run, due to destruction of the softened skin. The microscopic flakes which are rubbed from the metal contact points act as abrasives which, when mixed in the sealed lubricants, rapidly disintegrate the structures.

Before attempting a detailed survey of the deficiencies of the various atmospheres, as related to their outstanding constituents, the reactions listed in table VI are presented as being the most important in controlled atmosphere reactions.

All of the reactions are reversible, dependent upon their inter-reacting balances, total concentrations, equilibrium ratios with respect to each group of interacting constituents, and the thermal equilibrium constants as well as to the relative activity of various forms or isotopes of carbon as present or precipitated on the activating steel surfaces.

The first four reactions listed in table VI are the most destructive and most desirable to control. It is interesting to note that to avoid such reactions, all sources of moisture must be removed or controlled. Complete drying of an atmosphere high in CO_2 is wasted effort, for as the concentration of H_2O is decreased, the rate at which CO_2 combines with H_2 to form water is increased, thus defeating the efforts to remove the water. In atmospheres containing much CO , complete removal of H_2O and CO_2 does not answer the problem, for in compliance with equation 10, reaction occurs between H_2 and CO until a condition of equilibrium is reached with respect to the steel being treated at a given temperature (ignoring, for the moment, leaks and furnace lining activity and their

total effects on the atmosphere). The reaction of CO and H₂ is directly proportional to their total concentrations, in the absence of water; therefore class 4 atmospheres are particularly susceptible. Although initially dried and freed of CO₂, to a dewpoint of -65°F and a CO₂ content of 0.001 pct, equilibrium between CO, H₂ and H₂O will not be reached in an atmosphere containing 30 pct CO, 25 pct H₂, balance N₂, until enough water has been formed to bring the dewpoint up to +22°F, which activates decarburizing tendencies and increases surface roughness. In this respect, a class 2 atmosphere which has been dried and freed of CO₂ is not so susceptible to water formation by the interaction of H₂ and CO, due to the higher diffusion effect of N₂ and the lower total concentrations of the active constituents. In an atmosphere which initially contains 18 pct H₂, 11 pct CO, balance N₂, equilibrium with water is reached at a dewpoint slightly under 0°F (a range usually quite safe for most treatments of steel), and no noticeable roughening takes place.

The second group of three reactions in the listing relates particularly to the carburizing-decarburizing cycles. The direction of movement in any listed reaction depends upon the total concentration of constituents, the ratio of each active component to its allied constituents, the temperature at which the work is being handled and the composition of the steel in contact with the work. It is interesting to notice that atmospheres in which the ratio of H₂ to CH₄ is very high are quite susceptible to decarburizing reactions with the steel in order to produce enough CH₄ to balance the reversible reaction, 6. Classes 3 and 4 are most prone to decarburization as a result of this reaction. The introduction of free CH₄ can offset this tendency, but CH₄ is difficult to control, to avoid a carburizing balance or a sooting condition. The function of water in conjunction with this group of actions is more catalytic than chemical. Moisture keys the chain of reactions which decarburize the steel, particularly activating the reaction of hydrogen with the carbon content of the steel. In view of the fact that it is patently impossible totally to dry and exclude any oxygen sources from furnace atmospheres (or if total removal and exclusion of oxygen or water vapor were possible in compliance with reaction 10) water would tend to form in order to establish an equilibrium condition. Since the formation of water in an atmosphere is directly proportional to total concentration of H₂ and CO, in the absence of H₂O and CO₂, it is obvious that

classes 3, 4 and 10 are the most susceptible to the reaction, which partially explains their pronounced roughening effects on more sensitive alloy steel surfaces.

The third group of two reactions pertains particularly to reactions with nitrogen. The reactions are introduced with particular reference to the formation of atomic nitrogen in electrically-heated ammonia dissociators, or in electrically-heated cracking chambers for fuel gas atmospheres, where the gases are free to circulate in and around the heating elements. The catalyzed reaction of molecular nitrogen in contact with incandescent electric elements forms active nitrogen, which combines with whatever available oxygen is present to form nitrous oxides—or, an appreciable percentage contacts the work and either reacts with the iron to form brittle nitrides, contributing to the tendency towards spalling or "surface crazing," or reacts with the carbon in the steel to form CN gas (decarburizing the steel). This is one of the factors which destroys the supposed "neutrality" of nitrogen atmospheres, even when completely dried. Further, as previously pointed out, an atmosphere of pure nitrogen, which is an impossibility, would be decarburizing to most carbon steels due to the absence of a back pressure of carbon to balance the carbon in the steel.

The final group of three reactions is important as the primary cause of carburizing or soot formation, and as all three reactions can become sources of water vapor, directly or indirectly through formation of CO₂ (as in reaction 12), they can proceed in accordance with reactions 11, 4 or 2, depending upon the relative balances of other constituents.

Very little is understood of the mechanics of soot formation. Concentration of carbon sources, to control the rate of precipitation of carbon essential for carburizing, also causes the formation of insoluble soot. The rate of flow of a carburizing atmosphere over and around the work governs, to a large extent, the uniformity with which solution of carbon is obtained, as well as the type of soot deposited, and the rate with which it precipitates while a particular treatment is in progress in a furnace with a controlled atmosphere. A slow flow of carburizing gas may yield irregular case depths, while a moderate flow yields a more uniform depth, and a rapid flow creates a hard coat of coke. It is difficult to understand why too rapid a circulation of rich gases should give rise to hard carbon formation—it would seem to be more likely that the soot would be carried away in the stream of

TABLE VI
Important Chemical Reactions in Controlled Atmospheres

(1)	Fe	+	H ₂ O	⇌	FeO	+	H ₂	oxidizing, scaling
(2)	Fe	+	CO ₂	⇌	FeO	+	CO	oxidizing, scaling
(3)	CO	+	H ₂ O	⇌	CO ₂	+	H ₂	decarburizing or oxidizing
(4)	Fe ₃ C	+	CO ₂	⇌	3Fe	+	2CO	decarburizing
(5)	3Fe	+	CH ₄	⇌	Fe ₃ C	+	2H ₂	carburizing or decarburizing
(6)	CH ₄	+	heat	⇌	C	+	2H ₂	carburizing or sooting
(7)	Fe ₃ C	-	2H ₂	⇌	3Fe	+	CH ₄	decarburizing
(8)	4Fe	+	N (at)	⇌	Fe ₄ N			nitriding
(9)	2Fe ₃ C	+	2N (at)	⇌	6Fe	+	2CN	decarburizing
(10)	CO	+	H ₂	⇌	H ₂ O	+	C	carburizing or soot forming
(11)	CO ₂	+	CH ₄	⇌	2H ₂ O	+	C	carburizing or soot forming
(12)	2CO	+	heat	⇌	CO ₂	+	C	soot forming, carburizing

gases as rapidly as it is formed. This does not occur, however, as the formation of soot is catalyzed by contact with the steel being processed, and a rapid flow of rich gas seems to increase the rapidity with which a source of soot is constantly presented and from which an even denser insoluble precipitate can be drawn.

The question of the governing factor which determines whether free carbon will be soluble or insoluble in a given steel remains inadequately answered. The rather illogical theory that it is determined by whether the carbon is freed as atomic or molecular carbon is without foundation, since all carbon freed from chemical compounds is initially freed in atomic form. The question of the amorphous form of carbon being released is similarly inadequate, for before carbon can assume any of its physical forms it must be in one or the other of its molecular forms. There remains the possibility of the influence of the isotopic modifications of carbon as an initial determinant of whether the carbon enters solution or whether it precipitates. Recent study of carbon forms, in conjunction with atomic energy research, has disclosed that numerous isotopic forms of carbon in varying relative proportions exist, which have various valence capacities. It may well prove to be that various forms of carbon are more or less soluble in steel in conjunction with their isotopic forms. Should this be the case, it then might be possible to seek out ways of isolating the active forms of carbon and introducing them into controlled atmospheres as sources of additive carbon for case carburizing purposes, free from the difficulty of hard coke formation.

It is exceedingly difficult clearly to separate and define any single reaction, or even a major group of reactions, where all active constituents co-exist. Change in the proportional presence of any one reaction, or any group, precipitates balancing reactions in all remaining constituents. Equilibrium therefore is merely a condition under which the mutual interaction of all constituents of the atmosphere, the steel, and the component parts of the furnace, is such as to result in an effectual balance between the factors governing gain and loss of carbon or other active constituents in the steel or other metal being treated.

Exclusive selection of constituents usually has been carried too far. The persistent idea that a single nonreactive gas, such as pure nitrogen, helium, or argon or any of a number of theoretically neutral gases, is a suitable way of avoiding all reactions which are detrimental to steel, must be forgotten. At the present stage of understanding of heat-treating phenomena, it appears that the total exclusion of detrimental constituents, such as water and carbon dioxide, from the generated atmosphere, coupled with a minimum concentration of active constituents, such as hydrogen and carbon monoxide, is the most desirable base atmosphere for the most critical treatments.

The relative interacting effects of water and carbon dioxide have been fairly well covered in prior text. An attempt will be made to delineate the effects of each of the other major constituents, alone and as affected by major changes in the others.

Hydrogen was long thought to be an ideal neutral atmosphere for handling carbon steels, in spite of the fact that the entire life cycle is dependent upon the hydrocarbon series and that the known affinity of hydrogen for carbon is second only to that of oxygen and is governed by conditions of temperature, relative concentration and total pressure. It is true

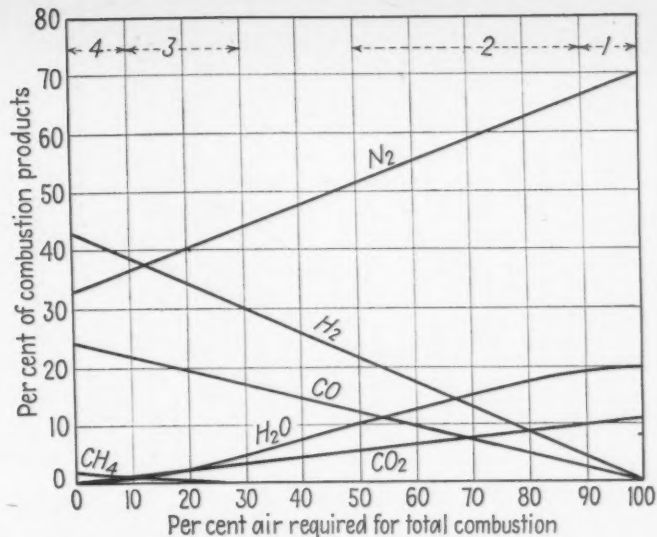
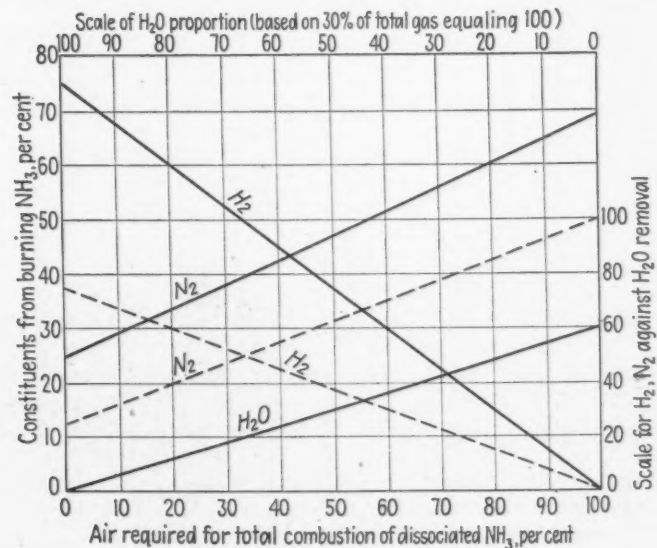


FIG. 1—A representative combustion curve showing range of combustion products to be obtained by treating 1000 Btu fuel gas with various proportions of air with indication of the general divisions of the four atmosphere classes of group I.

that in a completely dry atmosphere of hydrogen, little reaction is noticed between the carbon and the hydrogen. However, it is just as true that completely dry hydrogen does not react with oxygen, for the same reason. A little water is necessary to key most of the hydrogen reactions, if not, in fact, all of them, and as it is completely impossible to exclude all sources of oxygen and water from any practical industrial process, hydrogen is never nonreactive to the carbon in the steel. Furthermore, as the total concentration of hydrogen present in a given atmosphere increases, the tendency for decarburization to occur, increases correspondingly.

The detrimental effects of hydrogen are not confined to the surface effects of carbon loss. The marked tendency for the hydrogen to penetrate the interboundary channels of steel, where a differential of

FIG. 2—Curves showing proportions of N_2 , H_2 and H_2O resulting from dissociated NH_3 being combusted with air. Dotted lines indicate proportions of N_2 and H_2 with progressive removal of water formed in combustion. Lower right corner has short line indication of CO_2 contamination drawn in with combustion air. In reading lines, observe scales which apply to the two sets of proportions.



pressure exists with respect to hydrogen, is a well known phenomenon which aggravates the decarburization tendency by permitting carbon loss to occur relatively deep within the steel. This results in an embrittling effect through destruction of grain boundary cementite. An analogous effect is well known in the embrittlement of copper alloys which are not free from oxides. The hydrogen is most effective in penetrating between the grains of the metal and in reducing the oxides, which in non-deoxidized copper occupy much more space than the resulting free copper. The mechanical effect is to leave voids throughout the metal matrix, effectively reducing its mechanical strength though actually purifying the metal. In steel, the loss of carbon not only softens the surface, but if exposure continues long enough, most alloys will be very appreciably embrittled.

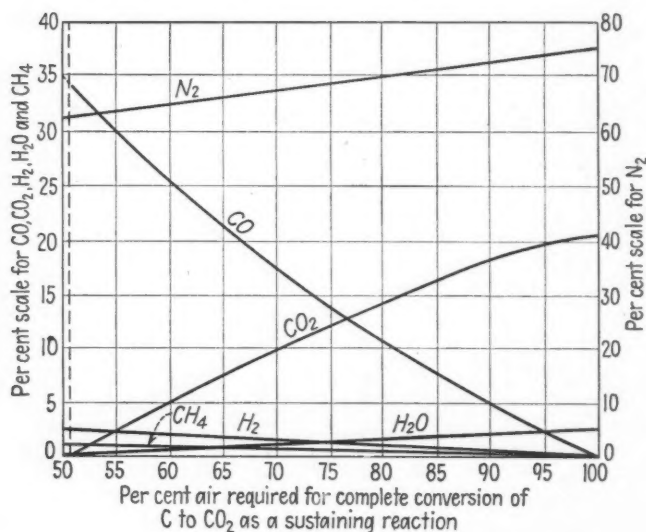


FIG. 3—A set of curves representing range of reducing atmospheres normally within the range of operation of charcoal generators. Addition of oxygen, in air, to right of the chart creates oxidizing atmospheres. Most generators do not operate to left of dotted line (below 51 pct air).

The reducing power of hydrogen is its chief advantage in bright annealing, hardening and otherwise processing steel alloys containing more than 1 pct Cr. Chromium forms selective oxides and has such an affinity for oxygen that it even removes it from CO to form oxides, which not only destroy appearance but also reduce ability to resist further oxidation and definitely injures electrical properties. Mixtures of hydrogen and nitrogen, where hydrogen is the major constituent, retain most of the desirable characteristics of pure hydrogen and are less expensive to produce and use.

An atmosphere which is nearly free of hydrogen, such as class 10 gases, is not advantageous due to two significant reactions. First, the ability of hydrogen to neutralize oxygen and balance the oxidizing tendencies of water vapor is a function of the ratio of H_2 to H_2O . Though total concentration is not the only determinant in an atmosphere which is nearly free of hydrogen, the relative effect of otherwise small percentages of water becomes quite detrimental. Further, where the rate of flow of such a gas through a furnace is appreciable, the theoretically controlled atmosphere may be serving as a carrier for water vapor, which, though it may be less than $\frac{1}{4}$ of 1 pct, may be very destructive throughout a given heat treating cycle because of the total quantities coming in con-

tact with the metal. Second, the tendency for methane to carburize is retarded by the presence of hydrogen in sufficient quantities to reach equilibrium. The same situation exists with respect to an initially low percentage of methane in an atmosphere with some considerable flow over the work. In an atmosphere containing enough hydrogen, a concentration of 1 pct methane may be quite neutral or may tend to counteract the decarburizing tendencies of the hydrogen. However, when the proportion of hydrogen is insufficient to stabilize the methane, an atmosphere lean in hydrogen may serve as a carrier for a carburizing gas which may contain less than 1 pct methane by volume, but may be, depending upon the susceptibility of the steel, very carburizing. These two points are either missed or ignored by the proponents of class 10 types of atmospheres.

A high concentration of hydrogen is undesirable for reasons which are the converse of the above. In atmospheres such as classes 3, 4 and 5, decarburization may completely destroy the surface desired for required performance characteristics of the heated parts.

In order to balance decarburization in high concentrations of hydrogen, increasing quantities of methane must be added. Reactions such as 7, 10 and the inverse of 3 and 6 are governed by total concentration of hydrogen and the relative proportions of other active constituents. In order to avoid the disadvantages inherent in atmospheres such as represented by classes 3, 4, 5 and 9, where too great concentrations of hydrogen exist, and the inverse situation in atmospheres 1, 10, 6, 7 and 8, where too little hydrogen is present, an average condition seems necessary, which class 2 atmospheres seem to offer. Control of the hydrogen-related reactions can be carefully governed in class 2 atmospheres, and due to lower total concentration, many reactions become proportionally so slight as to have negligible effect.

The total concentration of CO present in an atmosphere has varying effects on a given treatment cycle. In the total absence of CO_2 and H_2O , too high or too low concentrations of CO have detrimental effects. The fact that CO is relatively stable at high temperatures minimizes the tendency for it to react directly to carburize steel. However, in atmospheres having high concentrations of hydrogen, reactions, such as number 10, take place to effectuate an equilibrium between hydrogen and water, with deposition of soot or carburization of the steel. As these two effects are governed by the total concentrations of both CO and H_2 (in the absence of H_2O), and as the total reaction is proportional to the initial difference in proportional presence of H_2 and H_2O , sooting and carburizing occur in atmospheres containing very high concentrations of hydrogen. These are sufficient, in some instances, to create an oxidizing condition in other phases of a heat cycle. Further, with high concentrations of CO, in the absence of CO_2 , reaction 12 occurs to attempt an equilibrium between CO and CO_2 . As CO_2 forms in the presence of large concentrations of either H_2 or CH_4 , and in absence of H_2O , reaction 11 takes place, increasing the carburizing tendency and the formation of water. It appears from this that excessive concentrations of CO in the presence of high concentrations of H_2 create several difficulties.

The reverse situation of the above paragraph holds as many drawbacks. In atmospheres low in or lacking CO, in the presence or absence of H_2 , decarburization is quite pronounced (accelerated by the presence

of water, as discussed in connection with hydrogen). The necessity for the existence of a carbon potential in an atmosphere has been repeatedly mentioned. This fact is frequently overlooked. The laws of partial pressure are not confined to the reactions of gases, however, but are very pertinent to (1) molecular escape pressures of all materials, (2) functions of evaporation in liquids, and (3) sublimation of solids into gases, or into other solids or liquids. The sublimation of carbon from various steels in atmospheres lacking carbon potentials sufficient to counteract the escape tendency, obeys the same laws of partial pressure which govern the interaction of all constituents of the atmospheres themselves. Where the CO concentration is low or lacking, reactions such as 9 and 7 occur and remove carbon from steel.

The third situation, occurring in class 10 atmospheres, where high concentrations of CO exist in atmospheres low in H_2 , is unsatisfactory for reasons already mentioned under the hydrogen discussions, as well as for the reasons given above (as being detrimental to the steel in high CO atmospheres). The stability of CO at high temperatures minimizes the soot formation tendencies at elevated temperatures, but all atmospheres rich in CO and low in CO_2 tend to react to precipitate soot as the temperature declines, as experienced in furnace cooling of bright annealed or normalized steels. The rate of soot deposition is proportional to the total concentration of CO in the initial absence of CO_2 .

From the foregoing discussion it becomes evident

that the greatest degree of metallurgical control can be attained where nominal concentrations of both H_2 and CO can be had, in the controlled absence of H_2O and CO_2 . Naturally the tailoring of any atmosphere must attain required quality with the minimum of cost. In some treatments the optimum results can only be attained in completely dried atmospheres, freed of all CO_2 and H_2O , containing the optimum concentrations of H_2 and CO, which, as demonstrated in the survey of performances of each constituent, appear in theory to be concentrations normal to class 2 atmospheres. Interestingly enough, recent practical experience has corroborated the theoretical aspects and the results can be readily checked. Also, as tables II, III and IV (see preceding article) tend to show, various modifications of class 2 atmospheres can be made to handle all processes, economically and effectively, except the few requiring pure hydrogen. This being understood, it becomes quite probable that generators will be developed which will have a large central raw base atmosphere source from which varying amounts of gas are withdrawn and modified to fit the requirements of whatever range of processing they may be intended for.

Another interesting difficulty is the etching effect of various atmospheres on steel. This etching, or roughening, is most pronounced on critical materials, in atmospheres such as those encountered in classes 3, 4, 5, and 10. The reactions which give rise to pitting and roughening are numerous, but an understanding is not difficult to attain.

The Ellipsoid Melting Furnace

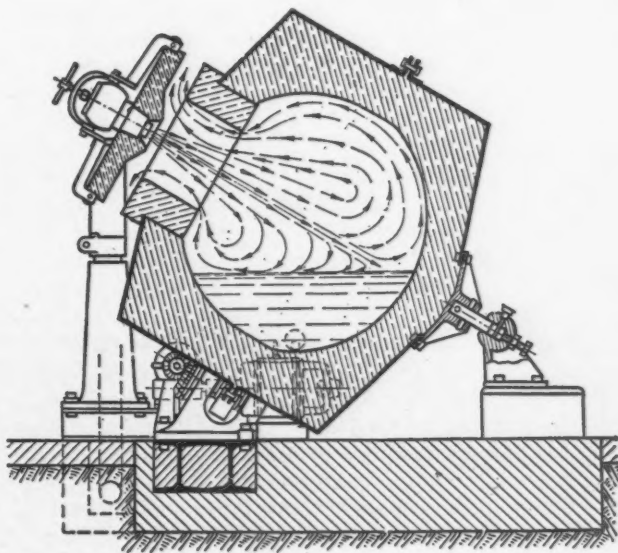
THE Ellipsoid melting furnace, a noncrucible, rocking unit, is described by A. J. G. Smith in *Metalurgia*, July 1946. This furnace, which was originally developed in England, has been modified (see accompanying figures) for utilization in several countries in continental Europe.

The furnace consists essentially of a strong sheet-metal outer casing of the drum type, which instead of being mounted horizontally on two trunnions is permanently tilted to an angle of some 30° from the horizontal. The furnace lining is either of special shape firebricks or stamped, the latter method being generally recommended as being cheaper and having a longer life before relining is required. Oil firing is usually adopted, although gas firing is also suitable. The burner is mounted upon a vertical pillar which also serves to carry the cover and operates under an air pressure of $1\frac{1}{2}$ psi. Under working conditions, the swing cover is opened and the metal charged on to the hearth, after which the blast from the burner is directed against the opposite wall of the lining, the products of combustion being discharged through the vent holes surrounding the burner.

While the melting is proceeding, the driving rollers are rotated by means of the reversing motor through suitable gearing in such a manner as to impart a rocking motion to the furnace body by which means the molten metal is constantly washed over the incan-

descent lining. When the charge is ready for tapping, the motor which serves for rocking also affects the pour.

This type furnace is now built in capacities of 6, 10, 20, 40 and 60 cwt (brass).



German Wartime Technical Developments

REPORTS of German practice in numerous technical fields of interest to engineers and executives in the metalworking field, issued recently by the Office of Technical Services, Washington, are briefly described below. These reports are in addition to detailed articles of certain phases of German practice previously published in THE IRON AGE.

Copies of the reports listed below may be obtained in either photostat or microfilm form, as indicated. Orders for copies of these reports should be addressed to Office of Technical Services, Department of Commerce, Washington 25, giving the "PB" identification number. See THE IRON AGE, June 27, p. 67, and Aug. 29, p. 39, for a list of earlier reports.

Radiographic Inspection—German wartime standards for industrial radiographic inspection, including several ingenious radiographic devices and techniques such as the use of hollow-anode, end-grounded tubes are described by F. H. F. Kaiser. Official German inspection specifications are listed. PB-23074; photostat, \$4; microfilm, \$1; 56 p.

Nitrogen in Bessemer—German methods used and contemplated at August-Thyssen Huette for reducing nitrogen content of basic bessemer steel are described. In addition to iron and steel production methods, report discussed processes used for making ring springs, gun tubes, and other finished steel products and discusses the German steel industry's raw material supply. Use of oxygen enriched blast is also touched upon. PB-27007; photostat, \$9; microfilm, \$3; 123 p.

Ball Bearing Manufacture—Making races for ball bearings on machines operating on the principle of a tire rolling machine is described in this report, prepared by Eugene E. Gloss, on German ball and roller bearing manufacture. Report includes specifications and operation charts for the production of bearing races by various German plants. PB-27520; photostat, \$2; microfilm, \$1; 24 p.

Gallium Thermometer—A gallium thermometer, used in Germany for direct temperature readings up to 2190°F, found by a British Intelligence Objectives Sub-Committee in the V. A. W. Lippewerk, a German aluminum reduction plant at Luenen, where they were used for routine measurements in the furnace bath are described. The thermometer consists of a quartz capillary inside a quartz envelope. The capillary contains pure gallium with a slight trace of iron. PB-25550; photostat, \$1; microfilm, \$1; 12 p.

High Temperature Solder—A German silver-magnesium solder, capable of withstanding temperatures as high as those found inside gas jet turbines is described by P. R. Vogt and H. A. Huebotter. Solder is composed of 85 pct commercially pure Ag and 15 pct Mg. The solder was used to attach the hollow blades of the Junkers 004 jet engine to turbine wheel. PB-23086; photostat, \$1; microfilm, 50¢; 7 p.

Semicontinuous Casting—Semicontinuous casting of rolling and extrusion stock and the use of electrical resistance furnaces in combination with induction melting is discussed in this report. Production techniques and equipment are also covered. PB-20663; photostat, \$3; microfilm, 50¢; 31 p.

Rubber Mounting Cement—German process for cementing rubber mountings onto steel machinery parts to eliminate vibration is described. Formulas for the cement are given, as well as for 11 synthetic and natural rubber compounds having various degrees of hardness for different types of mountings. PB-22807; photostat, \$4; microfilm, 50¢; 46 p.

Mortising Tools—Two unusual portable mortising tools developed by the Germans are described in this report. Feature of these tools is that they apply a chain saw principle to mortising work. PB-23138 (gasoline driven), photostat, \$1; microfilm, 50¢; 3 p. PB-19882 (electric motor drive), photostat, \$1; microfilm, 50¢ 5 p.

Metal Cutting—Two novel German metal cutting machines, one for profile milling, the other for tool grinding, are described in a report by A. H. Jobert and E. Dingley for the Joint Intelligence Objectives Agency. The report includes photographs and drawings. The profile milling machine works on the principle of a compound pantograph with a ratio of 1:1 between the cutter and stylus. The cutter duplicates an exact profile from a prepared template, including irregular profiles of any desired form. A feature of the milling machine is an optical device to prevent excessive gouging of the material while it is being cut by the stylus. PB-17546; photostat, \$3; microfilm, 50¢; 42 p.

Tension Pulley—A tension pulley for driving spindles which allowed German spinning mills to run 40,000 hr without relubricating was developed in a spinning plant at Denkendorf, according to this report. The pulley was roller-bearing, with a fixed outer cylinder and a rotating inner one. Another development at this plant was the use of vinyl plastic machine belting. The joints of the belts were heat sealed and hardly distinguishable. PB-18912; photostat, \$3; microfilm, 50¢; 31 p.

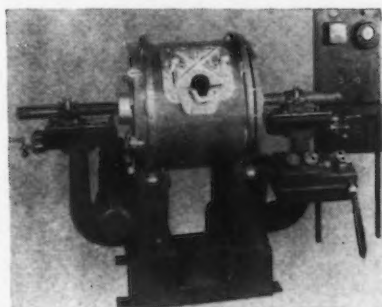
High Early Strength Cement—A high early strength cement used for construction work in Germany is described in this report. Tests made for the German navy indicate that it is highly resistant to sulphates and is mixable with water containing as much as 250 mg of carbon dioxide per liter. The cement is composed of a mixture of calcium, aluminum, ferrous and silicon oxides. PB-22813 photostat, \$1; microfilm, 50¢; 7 p.

New Equipment . . .

Foundry

Several types of melting furnaces, core grinders, portable mullors, sand conditioners and other foundry equipment such as dowels and gagger bars are featured in this week's digest of announcements.

DESIGNED especially for easy change of shells to permit melting a wide variety of ferrous and nonferrous alloys an indirect arc rocking electric furnace has been announced by the *Detroit Rocking Electric Furnace Div. of Kuhlman Electric Co.*, Bay City, Mich. Designated the type LF,



and rated at 100 kw with 200 lb nominal cold charge capacity, the furnace features nonrotating graphite electrodes supported by stationary brackets. Flexible copper conductors allow power to be brought to the water-cooled electrode clamps from bus bar situated above or below the furnace. Withdrawal of the electrodes allows the melting chamber to be removed without having to detach the electrode brackets. All controls over melting time and other melting factors are at the operator's finger tips. In a typical 9-hr day's operation the furnace has melted, it is claimed, 17 heats of red brass of 225-lb each, with a total overall energy consumption of only 318 kw-hr per ton.

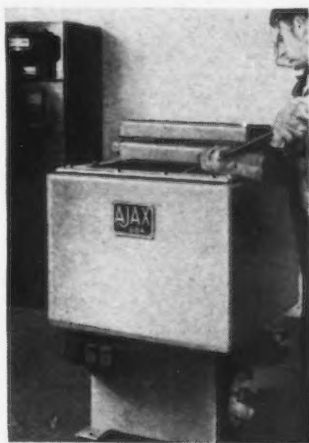
Molding Alloy

CALLED Moldaloy, an alloy said to have wide possibilities as a molding material for the casting of plastics, rubber and other materials, has been introduced by *Trethaway Associates*, 37 Wall St., New York. Moldaloy melts at 430°F, has a hardness of 22 Brinell, compression of 8000 psi, ten-

sile strength of 11,500 psi, and shrinkage of approximately 0.001 in. per in. It is recommended not only for molds for casting low-temperature-fusing plastics, rubber molds, and wax molds for precision casting process, but also for master patterns, forming dies for thin sheet metals and thermal plastics, and proof casting of molds, forging dies, etc.

Electric Melting Furnace

ECONOMICAL electric melting of aluminum alloys even in small units can be accomplished, it is said, with the 20 kw induction melting furnace for aluminum alloys introduced by the *Ajax Engineering Corp.*, Trenton, N. J. The unit, designed for use as a holding unit in diecasting and permanent mold plants, can be placed on the

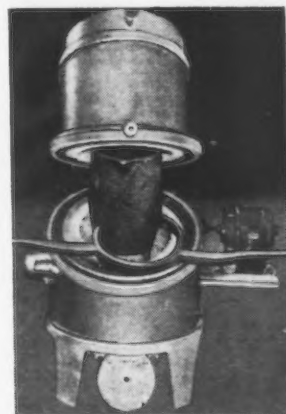


floor near the machines, without a foundation. A small self-contained control cubicle requiring little space is used to control temperature of the melt within a few degrees. The bath is maintained under gentle stirring, thus avoiding segregation of important ingredients. An important feature of this induction furnace is the elimination of fluxing. The automatic movement of the bath seems to act

in the same way as injected chlorine or nitrogen, the result being that the metal is automatically degassed. This unit costs from 8 to 12¢ per hr to run depending on the power rates.

Crucible Furnace

DESIGN of the Iler crucible draw furnace, manufactured by the *Fen Machine Co.*, 1354 Babbitt Rd., Euclid, Ohio, is said to insure several distinct advantages



in nonferrous foundry operation. Constructed of heavy gage steel, the furnace is divided, on an inclined plane, into two parts, hinged at the back. The lower section contains the burner. A closed passage, built into the wall of the lower section, conducts the air from the blower to the burner. Traveling through this passage the air picks up heat, returning it to the combustion chamber. Thus preheated, this air facilitates combustion, resulting in a short flame, retained down and around the crucible. Tests show that this preheated air effects a saving of 20 pct in natural gas and a correspondingly greater saving where fuel oil is used. Raising or tilting the upper part of the furnace allows easy access for charging or removing the crucible. No tongs or overhead handling equipment are required. The spe-

cial, open-side shank provided with the furnace makes handling easy and allows direct pouring. An automatic air lift opens and closes the furnace at the touch of a valve. A blower, delivering 300 cu ft of air per min at 13 oz pressure is the only auxiliary equipment required.

Core Grinder

UNDER the trade name Murco, a portable production machine for grinding sand core faces before pasting cores together, has been announced by the *D. J. Murray Mfg. Co.*, Wausau, Wis. The machine is said to grind all cores accurate to predetermined dimensions required. It eliminates patching broken joints and does not tear core edges. The unit is built to

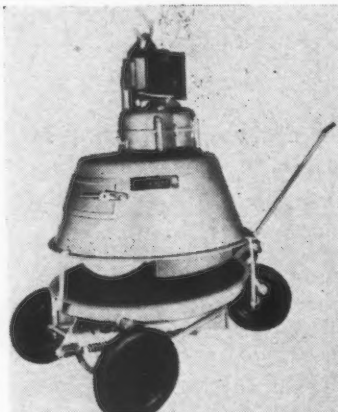


machine tool precision, is equipped with a 1-hp motor, and will handle a large range of core sizes. The grinding head is adjustable and locks firmly into position. Small cores can be mounted in multiples in gang fixtures, providing a large daily capacity on cores of one run, or a quick, easy changeover can be made for small runs of various cores. The machine is a compact, portable unit requiring floor space of 3 x 5 ft for operation. Maximum clearance between the face of the table and the face of the grinding wheel is 18 in.

Portable Mullor

SUPPLEMENTING a line of portable mullors for small and large foundries, the *Beardsley & Piper Co.*, 2424 North Cicero Ave., Chicago 39, has presented an enlarged, and completely new portable mullor known as Model No. 7 Mulbaro. This new Mulbaro, used for mulling both molding and core sand, has double the capacity of

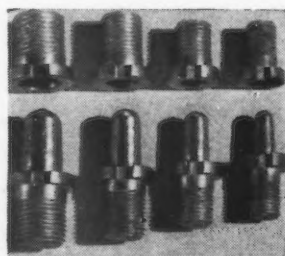
the former model, has more ease of portability plus engineering improvements designed for faster,



more convenient mulling, and lower cost maintenance. It is composed of two separate units: the three-wheeled barrow and the mulling mechanism. The barrow, used for transportation and for holding the sand while it is being mulled, has a spring controlled, hinged bowl to facilitate ease of loading and dumping. The mulling mechanism, operated by electric motor, and suspended by a chain, is lowered and attached to the barrow for the mulling operation. Contained in the mechanism are two-rubber-covered wheels, which fit down into the sand in the barrow. These wheels are designed to the contour of the barrow bowl at such an angle that they conform to the curve of the bowl as they travel, eliminating any tendency of sand slippage or damage to sand grain structure, thus helping to maintain uniform permeability. The Mulbaro's squeezing and kneading action provides proper distribution of all additions.

Metal Dowel

AN IMPROVED type of metal dowel for metal patterns and core boxes has been announced by



the *Kindt-Collins Co.*, Cleveland 11. Known as the Master Sure-Lock dowel, it features a new type shoulder and taper fit of body which keeps the dowel anchored tight. It

has a longer more accurate draw. A wrench of hardened steel permits firm tightening of dowels, which are accurately machined from steel, hardened and cadmium-plated to prevent rust. They are available in sizes No. 1, 2, 3 and 4 Standard, No. 2 and 3 Special with extra long pin and body on male part. Only four tools are required: drill, Master-Sure-Lock combination counter-bore and reamer, Master-Sure-Lock tap, and wrench. The dowel is packaged 50 in a box.

Sand Conditioner

FOR conditioning backing or core sand stored in the foundry yard, *Royer Foundry & Machine Co.*, Kingston, Pa., has developed a portable gas engine-driven conditioner which breaks up all lumps, opens and aerates the sand, and eliminates refuse. It is a self-contained unit, lightweight and rubber tire mounted, designed for yard service where no electrical outlet is available. It comes in three

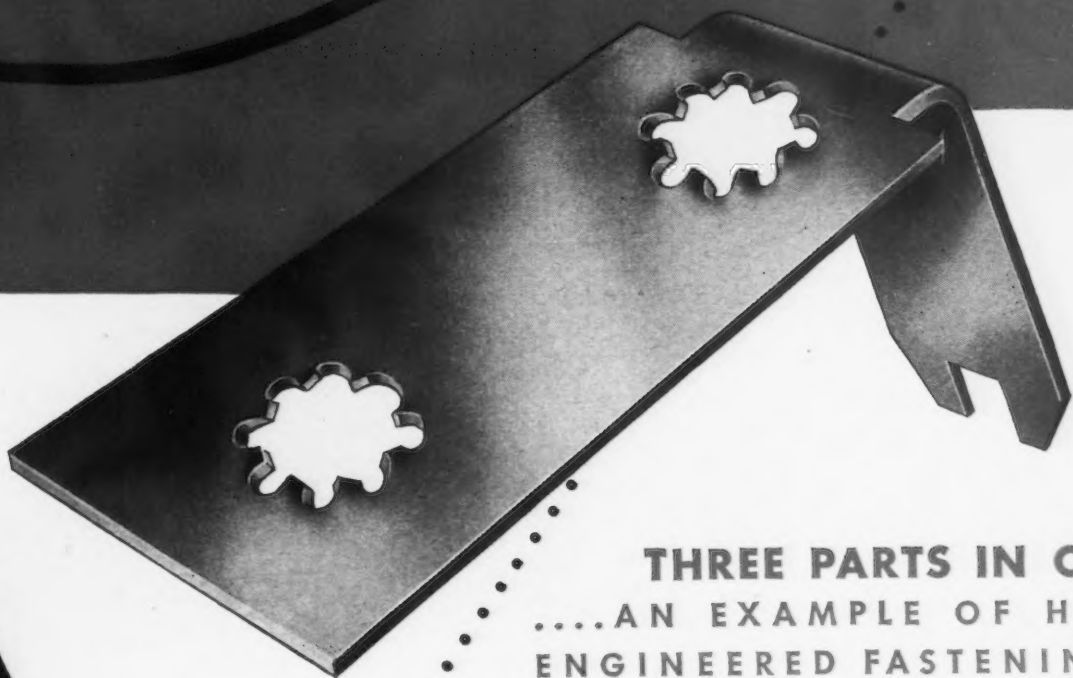


sizes: 1 to 3, 3 to 5, and 3 to 8 cu yd hourly capacity. The machine can also be used indoors and provide all the essentials for thorough sand preparation.

Gagger Bars

HI-BOND reinforcing bars have been found suited for foundry gagger bar applications, according to a report from *Joseph T. Ryerson & Sons, Inc.*, P. O. Box 8000-A, Chicago 80. The special design of Hi-Bond, which consists of double reverse helical ribs between horizontal ribs, provides maximum mechanical grip as well as the greatest bonding surface for a given section of gagger bar, it is said. Sand may be packed more firmly and evenly around each gagger, holding the mold together more securely. Compared with twisted squares, it is said that Hi-Bond bars are easier to handle, and more readily formed, straightened and re-formed. The cost is considerably less, it is reported.

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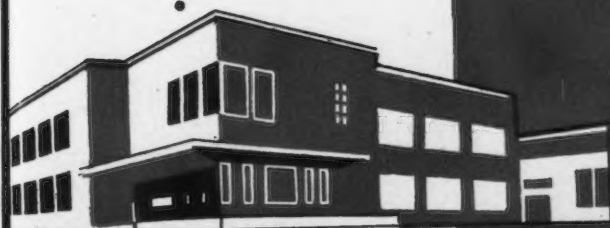


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ENGINEERED FASTENINGS
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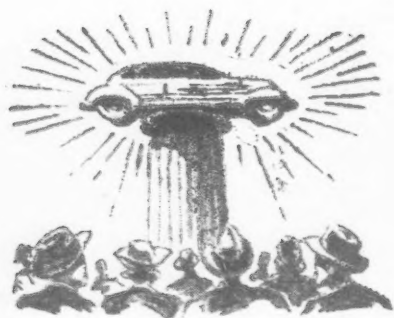
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Plants of Chicago and St. Louis, Illinois. In Canada: Canada Black Tools, Ltd., Toronto, Ontario.

Assembly Line . . .

WALTER G. PATTON

• Henry Ford II offers blueprint for sound labor-management policies but sees little chance for guaranteed annual wage . . . 51,000 idle in Detroit because two employees are fired.



DETROIT—In a talk before the Economic Club last week, Henry Ford II took a penetrating look at the possibility of steady employment in the automobile industry. What he saw was more in the nature of obstacles to guaranteed employment than a promise that such a universally desired goal could be reached.

Nevertheless, the picture Ford gave his listeners was illuminating, concise and quite free from emotionalism—indeed a comparatively rare item in the field of automotive labor-management relations. More important, young Ford outlined for all who wish to benefit by it the basic principles which will guide the Ford Motor Co. in its dealings with labor, with its customers and with its suppliers.

If labor was looking for a blueprint of the grounds on which labor and management could meet with confidence and candor, this was it so far as the Ford Motor Co. is concerned.

If it accomplished nothing else, the Ford speech brought to a merciful halt the volume of charges and countercharges that have been flying thick and fast in this automotive center between labor and management and which bid fair to grow both in volume and vituperation as

the union and Chrysler go forward to a showdown over wage rates for Chrysler workers.

SPEAKING of the "guaranteed annual wage," Ford pointed out that "The trouble with most of the plans I have seen for a so-called 'guaranteed annual wage' in the automobile industry is simply that they guarantee an increase in manufacturing costs. Unless such a plan would clearly insure a substantial increase in productivity or in economics to offset the increase in costs, it is obvious that the result would be simply to increase the cost of automobiles." To that extent, he added, the standard of living of all Americans would be reduced including those who would seem to benefit from such a plan.

"Success in the field of mass production depends upon ever lower costs," he said. "Lower costs make possible greater quantity production and greater quantity production makes possible lower prices. *No manufacturer in a mass production industry is interested in any program involving higher prices for fewer products.* Nothing gives the mass production manufacturer greater dissatisfaction than rising costs and rising prices," he asserted.

According to Ford, there are three obstacles to stabilized year-round employment in the automobile industry—obstacles that are not easily hurdled. They are: (1) Seasonal buying habits of the public, (2) the desire of the American consumer for a new and improved model which necessarily causes cessation of production work to permit retooling and (3) the dependence of the automobile industry on its thousands of suppliers.

The Ford Motor Co., he revealed, has 2853 major suppliers from whom it buys a great variety of products and parts. Another 3000 suppliers furnish a variety of goods and services necessary to run the business—everything from toothpicks to locomotives. A Ford speedometer supplier alone is served by 200 suppliers, he pointed out.

WHEN all this is added up, according to Ford, it is discovered that the problem of stable employment in the automobile indus-

Dealers Urged To Turn in All Scrap

Detroit

• • • The Automobile Manufacturers Assn. has told 35,000 dealers throughout the country that the production rate in the automotive industry hinges on increased collections of scrap for the steel industry.

Motor car producers have appealed to dealers to turn in every bit of scrap metal they can find in their establishments. Automobile production, they say, is being held down by the already limited supply of steel and it will further decrease unless there is an immediate and substantial increase in scrap metal collections.

One automobile producer has disclosed that deliveries of sheet steel to his plant are at least 25 pct short of requirements.

Similarly, foundry operations are being seriously handicapped by the scrap shortage and many are being kept going by scrap trucked to them daily by automobile companies whom they supply with castings.

try really involves a whole cross-section of American industry. The employment problem, he said, is not with one big business such as Ford Motor Co. but with many thousands of little businesses.

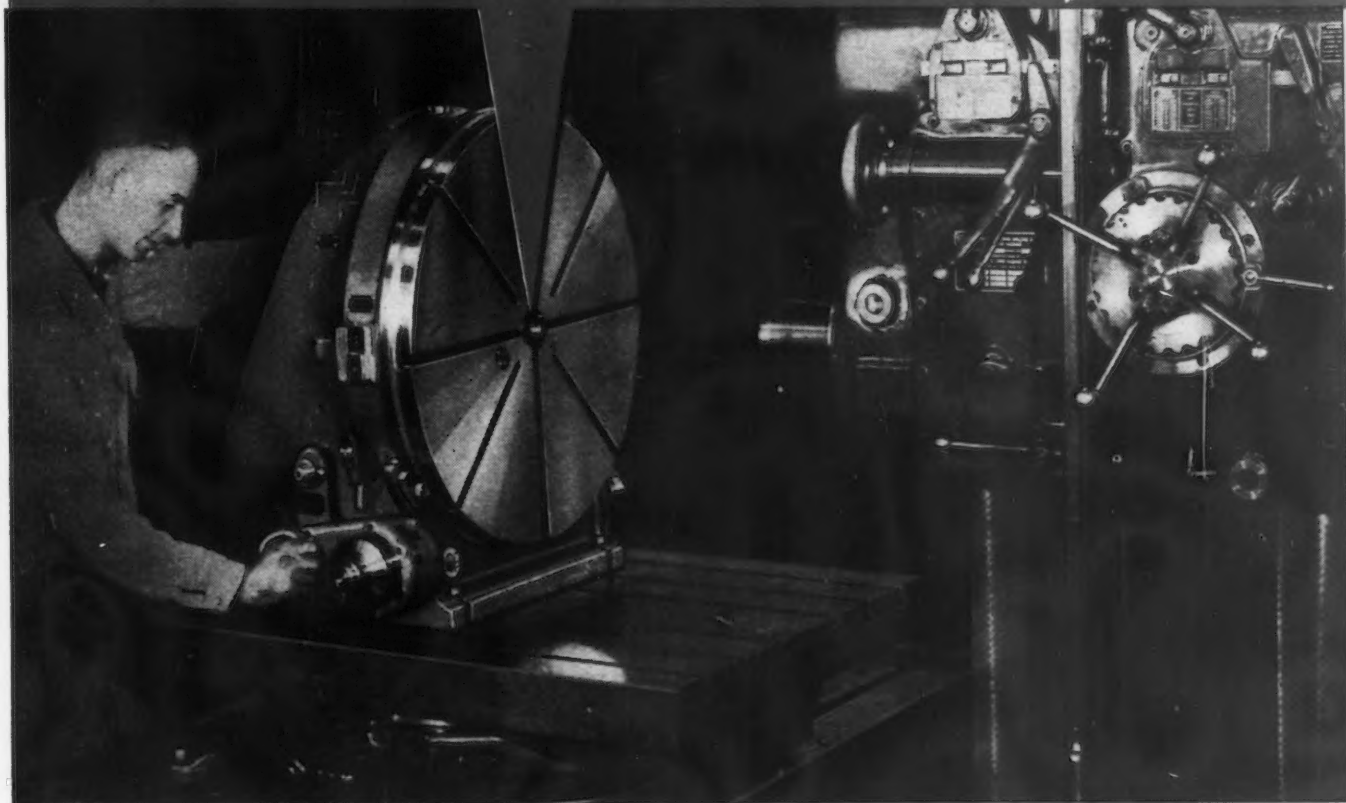
Ford asserted that the use of the term "guaranteed annual wage" comes close to being a political phony since it suggests that someone is in a position to guarantee an annual wage and is refusing to do so.

Real wages, he said, are directly proportional to the total amount of things we have to divide.

The solution to our present problem, according to the Ford president, seems to lie in two related goals: There must be great forward steps in the productivity of machines and there must be an increase in the productivity of men. Improvement in machine productivity, he observed, will come from new mass production techniques, special-purpose and multiple operation machines; and standardization leading to interchangeability of parts.

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THE IRON AGE, September 26, 1946—85

ity, Ford continued, management can take the initiative but labor must make a major contribution. Familiar practices of feather-bedding and slow-down lead to decreased production—exactly the opposite direction from the goals sought, he charged.

ACCORDING to young Ford, three of the honest specifications for a stable employment plan are that "it must have the effect of increasing production; it must be approached with an open mind; and it must be entered into in the spirit of sincerity and cooperation.

Coming after months in which Detroit's labor and management factions have been almost continuously at each others throat, the Ford speech this week offered perhaps the brightest ray of hope that management and labor in the automobile industry could get together in time to prevent ruinous inflation and mass unemployment.

Many industrialists here have resented deeply Reuther's initiation of the 18½¢ wage boost pattern and his radio attacks on executive salaries. Many of these attacks they claim, are purely for political reasons. The growing influence of Communism in the UAW (CIO) is also being watched anxiously with the vast Ford local the focal point at the moment. If Phil Murray actually does retire this fall, some say the union's best balance wheel will be gone.

On the other hand, many union officials are undoubtedly sincere in their belief that management is co-operating with the unions "only so far as they are pushed." "This," they maintain, "is what most of the pushing is about."

THE union charges further that management is resisting efforts to give labor a real share in improving production, that such suggestions on their part are almost universally met with the charge that the moves are disguised invasions of the prerogatives of management.

As to what management can do about the situation, some constructive suggestions have been made. Wage adjustments tied to extra production offers some possibilities provided such plans are not too closely identified with former piece-work schemes. Health and pension plans offer another possibility and

the union can be depended to push such demands if management does not beat them to the punch.

Automobile production is expected to drop sharply this week as a result of strikes which have idled 51,000 persons in the Detroit area. Much of the stoppage stems from the discharge of two employees—one at Briggs Mfg. Co. and the other a lone Chrysler employee.

THE Briggs strike was called in protest against the firing of a union steward. According to a company spokesman, the steward was fired after he ordered a line stoppage in the presence of three company officials. The company also charges that the resulting strike is a direct violation of Article 6, Section 14 of the Briggs contract which states:

"The Union will not cause, or permit its members to cause, nor will any member of the Union take part in any strike, either sit-down, stay-in or any other kind of strike or other interference, or any other stoppage, total or partial, of production at any of the plants of the company during the term of this agreement until the grievance procedure has been exhausted, and not even then unless sanctioned by the International Union."

According to Briggs, the grievance procedure was not followed; according to the union the strike is authorized by the International Board.

The strike at Dodge was in protest against firing of a probationary employee.

While the number of employees directly involved in the Briggs and Dodge strikes is small, the total number of workers idled as a result of the strikes was large enough to skyrocket payments by the Michigan Unemployment Commission by half a million dollars during the week. While workers on strike do not receive compensation, workers idled by strikes in other plants do receive compensation. The fact that industrial claims shot up so fast indicates that workers are losing little time in getting on the unemployed roles as soon as they become unemployed, whatever the reason for the lack of work.

OPA Advances Retail Ceiling Prices 6 Pct On Ford Automobiles

Detroit

• • • An advance in retail ceiling prices averaging six pct has been granted on Ford, Lincoln and Mercury automobiles by the Office of Price Administration. The new prices are effective immediately and continue until Mar. 15, 1947.

Increases in prices were requested by the company which showed that under former ceiling prices Ford was losing money at present operating rates and had little prospect of improving its nonprofit position in the future.

Under the new formula OPA price increases may not exceed an amount which will permit break-even operations.

According to a spokesman for OPA the only application of a motor car producer now pending is that of General Motors which has informally asked for a boost in the price of its cars. It is reported that GM is currently making a study of its profit position to determine whether they can qualify under the new formula.

Other automobile manufacturers have indicated they are not interested in a price increase at this time, according to an OPA spokesman.

The following typical prices apply to several Ford models now being sold:

	Old Price	New Price
Ford four-door sedan...	\$1,068	\$1,131
Ford super de luxe....	1,134	1,202
Mercury sedan	1,333	1,412
Lincoln sedan	2,059	2,185

The pricing formula which is applicable to passenger cars provides as follows:

- (1) Use of the general level of materials prices as of Aug. 31, 1946, in computing a new materials increase over 1941 costs.
- (2) Use of an increase factor for hourly costs based on increase in average hourly earnings.
- (3) Allowance of the increased costs of workmen's compensation expense, vacation pay allowance and social security taxes on a higher cost base.
- (4) Allowance of actual increases in general and administrative salaries over 1941 levels up to the level of the increase in direct and indirect labor costs.
- (5) Continued use of the previous profit allowance factor which is either the company's own profit rate or one-half the industry's profit rate on sales in the year 1936-1939.

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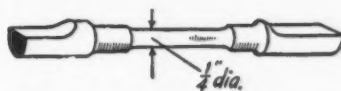
Tough
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Brittle
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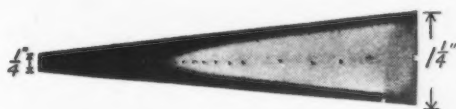
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THE IRON AGE, September 26, 1946—87

• WAA despite growing army of employees not moving surplus property as fast as was expected . . . Changes in policy cited as one reason.



WASHINGTON—The War Assets Administration has always prided itself on the "fact" that it is moving surplus property with relatively little cost to the government—both in money and personnel. It has available for inspection, statistics to prove its point. But statistics are traditionally interpreted in varying ways with the result that there are differences of opinion.

WAA has 45,000 employees. This force, which is large enough to make up a good sized town, is viewed by WAA as insufficient in view of its task of disposing of billions of dollars worth of surplus property. Several thousand more employees will be engaged soon; and the peak number will not be reached until after the first of next year. But it is also true that hundreds of thousands of GI's have, at one time or another, devoted their energy to surplus property and will continue to do so. This expenditure is not carried on WAA's books.

It is also true that WAA expenditures relatively are not great, considering the enormous selling job that is required. But money spent by the Army and Navy on surplus property, while such prop-

erty is awaiting removal by WAA, will run into the hundreds of millions of dollars.

Why this overlapping? Primarily, because WAA has not moved surplus property fast enough. Constant changes in policy have not helped.

IT IS completely erroneous to think that owning agencies have been relieved of the responsibility for the care and handling, classification, storage and transportation of surplus property merely because such property has been declared surplus.

Storage, handling and care of surplus property which WAA has not removed from the custody of the Army and Navy is still considered a major headache. The brass-hats feel that they should be relieved of this unwanted task and not be required to spend any part of their appropriations on surplus property accounts. They don't squawk about this outside their offices because of the Presidential ban on airing private wash in public.

The Army, having the greatest amount of property, has accumulated the largest quantity of undisposed-of surplus, imposing a heavy burden on personnel, space and funds. Owning agencies, in general, are responsible for the custody and protection of property until it is moved by WAA. Some property has been left in the hands of the Army for more than a year after it has been declared surplus.

Army officers contend that if GI's were replaced by civilians, WAA's personnel would have to be quadrupled at least. All of this adds to the difficulty of keeping an army of sufficient size for the duties outlined in the Constitution.

THE Army and Navy have been dragged over the coals about alleged destruction of property by permitting it to stand in the open for months on end. In a majority of these cases, the property belonged to WAA. However, if it was on an Army or Navy post, the military was blamed.

The Army is being pressed on one side to give its leased storage facilities. On the other side, it has to find space for surplus property

that has not been sold by WAA. Of the total storage space in Army depots, exclusive of the Army Air Forces, more than 30,000,000 sq ft is occupied by property which has been declared surplus and is awaiting WAA action.

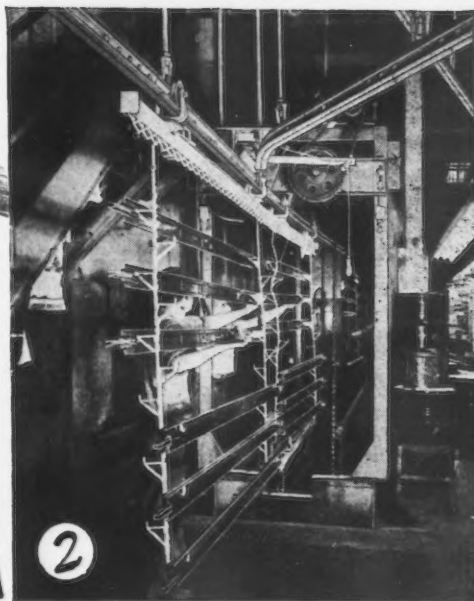
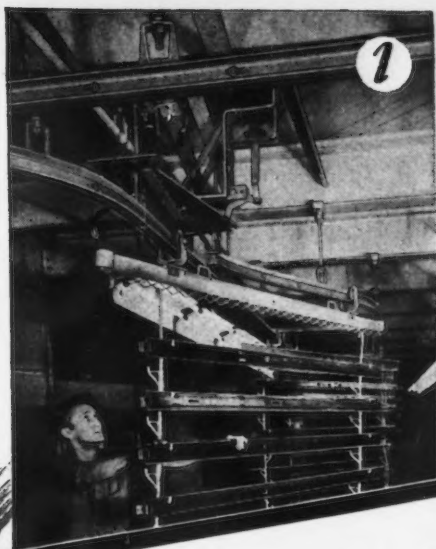
Of nearly 18,000,000 sq ft of leased warehouse space in operation in Aug. 1945, about one-third has already been released. Plans call for the release of an additional 6,000,000 ft by March 1947. Releases of the remaining leased space depends upon the removal of surplus supplies.

The cost of handling surplus property during fiscal year 1946 was borne almost completely from War Dept. funds. Some relief has been provided for the present fiscal year under the following policy, approved by the Bureau of the Budget. The surplus property agencies will finance: (1) The cost of care and handling of all surplus personal property which is located in facilities which contain only surplus property after the declaration of surplus is received by the disposal agency; and (2) the cost of maintenance, care, and handling of all surplus real property incurred beginning 60 days for nonindustrial and 90 days for industrial property after the disposal agency receives the declaration. All other costs of handling surplus property are borne by the agency making the declaration.

For these purposes, the Army estimates it will spend around \$50,000,000 during the current fiscal year. The Navy adds another \$100,000,000. The Navy will spend more because of the large number of surplus ships requiring extensive care. However, it should be pointed out that these figures are only the roughest of estimates; since the actual amounts will depend on the quantity of surplus property and the length of time such property is left in the hands of the military agencies.

* * *

ODDITY: OPA refuses to increase prices on scrap, except cast grades, while NHA pays bonuses of \$8 and \$12 a ton on the production of malleable and foundry pig iron, a higher priced product than scrap . . . Is this anomaly designed to hold down, if not re-



AMERICAN MONORAIL System Uses Power for SPOT Handling

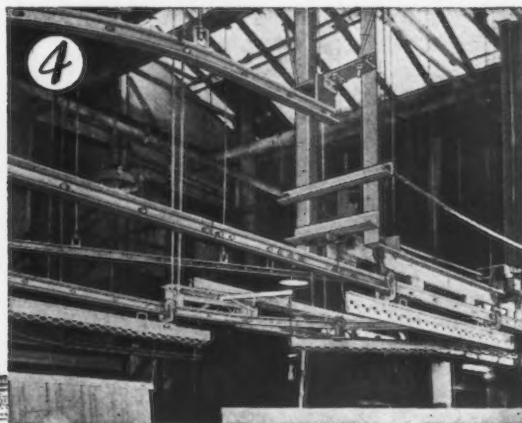
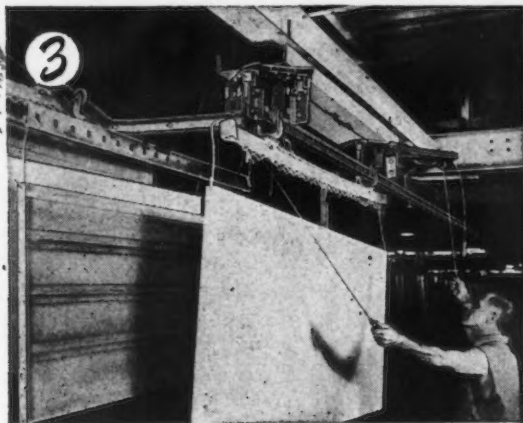
Extreme flexibility of movement is carefully maintained in this hand operated American MonoRail System. Where quick change of trolley travel or passage of carrier through process is required, power driven equipment takes care of such spots as . . .

1. Trolleys on parallel tracks automatically brought into single track alignment by solenoid operated switch.
2. Carriers roll on track sections for vertical passage through degreasing tank. Cleaned

parts move down the line to spray booths.

3. Crosstrack switches provide 90° transfer to shipping area as carriers roll off power conveyor in finishing oven.
4. Empty carriers raised to high level track for gravity return to loading station.

American MonoRail Engineers, with their wide experience in solving difficult handling problems, will gladly consult with you. Send for Bulletin C-1 illustrating hundreds of similar operations.



THE AMERICAN MONORAIL COMPANY

13103 ATHENS AVENUE • CLEVELAND 7, OHIO

THE IRON AGE, September 26, 1946—89

fuse, the price increase the steel industry is about to ask? . . . Quoted prices of pig iron now become mere paper prices . . . On malleable and foundry grades they are upped by the direct bonuses . . . on basic they are upped by reason of a \$2 subsidy when paid by furnaces which turn to foundry or malleable production after passing contracts for basic to other producers . . . Since this breaks through price ceilings, OPA has had to amend its pig iron schedule to support NHA's policy . . .

* * *

THE Senate Special Committee to Study Problems of Small Business has just come up with a report which recommends complete overhauling of the national transportation policy . . . It looks "eventually to the creation of a Dept. of Transportation with a cabinet officer at its head" . . . This report is largely a repetition of a report made 2 yr ago by the defunct Board of Investigation and Research about which Congress has done nothing except to let it gather dust . . . The Senate report was prepared by C. E. Childe . . . He was a member of the old BIR.

Metal Lath Producers Deny FTC Charges That Industry Fixes Prices

Washington

• • • Denial of charges of fixing and maintaining by cooperative action identical delivered prices and terms of sale for building lath has been made in answers filed with the Federal Trade Commission by the Metal Lath Manufacturers Assn., Cleveland, and its members. Revolving about use of the basing point system, the FTC complaint charged that price quotations and conditions of sale were made by dividing the United States into several geographical zones and naming identical delivered prices within any one zone regardless of the cost of delivery to purchasers.

The association and A. J. Tuscany, Commissioner and Treasurer of the Association, denied any knowledge of the basing point system and the Bostwick Steel Lath Co., Niles, Ohio; the Ceco Steel Products Corp., Omaha, and the Natural Gypsum Co., Buffalo, deny the allegations altogether. The other respondents denied that use of a zone system of delivered prices

is pursuant to any agreement to watch prices.

The Commission charges (that the 10 manufacturing respondents in the case are the only producers of metal lath in the United States and thus can dominate and control its prices) were challenged in most of the answers. They stated that the respondents are the only manufacturers of "expanded metal lath," but that other types of metal lath and other metal plaster bases are produced and sold in competition with their products.

Several answers also declared that in recent years, production of metal lath has been substantially affected by government restrictions and by inability to acquire an adequate supply of steel. As a result, it was pointed out, some of the respondents produced no metal lath at all for a period of 2 yr or more between 1942 and 1946.

The U. S. Gypsum Co., Chicago, denied the charge that as owner of a patent covering the latest improvement on metal lath it has used it and license agreements in connection with it for price fixing purposes. This charge was also denied by the other respondents.

Joseph A Sampson, Brooklyn, who was charged in the complaint with aiding and counseling the respondent manufacturers in the maintenance of a uniform method of computing and quoting prices for metal lath sold in the insular possessions of the United States, denies any connection with the distribution or selling policies or practices of any of the respondents. His answer declares that since September 1942, he has been engaged in work having nothing to do with the metal lath industry.

Respondents in addition to those mentioned, are: The Alabama Metal Lath Co., Birmingham; Goldsmith Metal Lath Co., Cincinnati; Milcor Steel Co., Milwaukee; Penn Metal Co., Inc., Boston; Tuscon Steel Co., Cleveland, and the Wheeling Corrugating Co., Wheeling, W. Va.

Upholstery Industry Aided

Washington

• • • Effective Sept. 23, OPA has granted manufacturers of metal upholstery springs, constructions and accessories a reconversion price increase of 3.5 pct to reflect increases in their basic wage rate schedules.

THE BULL OF THE WOODS

BY J. R. WILLIAMS





"Measuring at the Machine" MINIMIZES PRODUCTION LOSSES!

Reducing production LOSSES means reducing production COSTS. LOSSES usually occur at the machine—stopping such losses means down costs.

"Measuring at the Machine" brings the following advantages which contribute to being able to sell a product profitably at competitive prices:

When accurate gaging is practiced right at the production machine, scrap losses have been reduced as much as 80% and 90%.

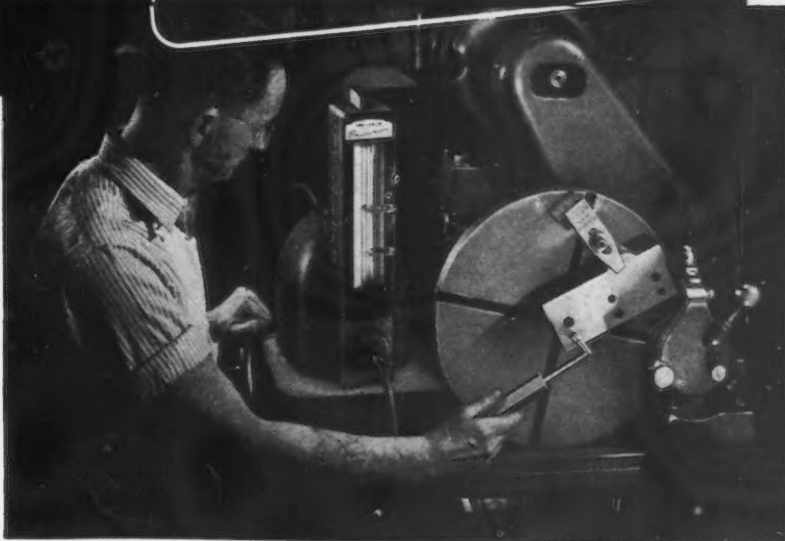
"Measuring at the machine" practically eliminates rework which is nearly always necessary.

When the gaging machine is directly connected to the production machine, the operator can see the results of his work as he produces them. This means that he can correct any errors immediately.

4 When high production gaging instruments like the Multichek, Precisionaire and Visual Gage are used at the machine, the floor space devoted to inspection operations, gage maintenance costs and the labor cost of inspection are all greatly reduced.

5 Under close dimensional control, finished products give maximum performance, greater service life, and help build a name for the manufacturer.

6 Fewer parts will wear out in service, and then replacement is quickly and easily made—no laborious fitting in the field is necessary.



**THE SHEFFIELD
CORPORATION**

Dayton 1, Ohio, U. S. A.

**MACHINE TOOLS...GAGES
MEASURING INSTRUMENTS
CONTRACT SERVICES**

• As steel shortage in West becomes more serious in face of reports of increased production of most critical products, large producers are put on the griddle.



SAN FRANCISCO—California, the land of plenty, the cornucopia of the world and the state with the highest percentage of population increase in the past 5 yr (unless Nevada is included where the migration of a few Indians or divorce seekers can throw the balance) is practically destitute—of steel!

The dismal story is pointed up on every side: Congressmen are sending pleading telegrams to John D. Small, Paul Porter, Wilson Wyatt and John R. Steelman; labor leaders predict mass unemployment; warehousemen display bare floors; home builders claim they are stymied; fabricators of sheet metal products bemoan production curtailments; Henry J. Kaiser states he is going to demand \$30 million from the RFC with which to build a 300,000 ton per year capacity sheet mill at Fontana; and the board of directors of U. S. Steel Corp. holds its first meeting on the West Coast after inspecting its production facilities.

Unquestionably steel demand in California—and the rest of the West—is far in excess of supply. Whether the shortage here is more acute than elsewhere in the country is debatable according to some

careful analysts. Probably it is, because of tremendously increased demand brought about by an 18 pct population increase in 5 yr; the scheduling of 20 pct of the nation's home construction in the West; development of new industries and expansion of old ones.

There are few communities in the state which cannot boast of a marked increase in the number of new industries; an increase in employment; and larger bank debits. It doesn't require a skilled market analyst to deduce that such conditions produce an abnormal demand for such a basic commodity as steel.

LAST week, Henry J. Kaiser told a press conference that the greatest need in the country today was an increase in the production of basic products. "Our country is short on copper, lead and steel to mention only a few. I intend to do something about steel and if we can borrow the \$30 million needed to build a sheet mill at Fontana, Kaiser Co., Inc., will build it in 18 months," he stated. Mr. Kaiser laid the responsibility for the shortage of many basic materials—including steel—to the lack of competition. "I believe that the 'big three' control so much of the production of the United States they don't have the competitive force to require them to get the results they could," he said. "They are inclined to buy government plants recently built and shut down their old ones," he added.

Mr. Kaiser's views on the sheet steel situation are shared by many warehousemen and fabricators who are no longer being supplied from eastern mills. However, data released by the American Iron & Steel Institute doesn't substantiate any implication that national production of steel sheets is declining. The Institute's recent publication stated:

"A study of AI&SI shows that since July 1, 1941, more new sheet and strip production facilities have been added than have been dismantled. The net effect has been to increase sheet and strip capacity, as of the present time, about 1 million tons above the July 1941 level. The Institute's survey

covered companies which have more than 95 pct of total sheet and strip capacity.

"BEFORE July 1, 1947, additional rolling mills, amounting to 2,500,000 tons of new capacity, will be added for production of these products. Indications are that even further additions (beyond the 3,500,000-ton increase from July 1941 to July 1947) will be made between July 1, 1947, and July 1, 1948.

"During 1941 shipments of hot and cold rolled sheets and strip totaled 14,570,000 tons."

At the conference held on the eve of his departure for Washington to appear before the Bland Committee investigating World War II shipbuilding, Mr. Kaiser reiterated his contention expressed last month (THE IRON AGE, Aug. 15, 1946, p. 109) that his Fontana plant was entitled to the same fixed charges as his competitors, especially as those of the corporation-owned plant at Geneva. He made it clear, however, that the \$30 million loan he would seek for a sheet mill was a different matter and that he would expect to pay that back in full, and that he felt entitled to an adjustment only on the original RFC loan.

Stating that, "What is sauce for the goose is sauce for the gander" Mr. Kaiser pointed out that perhaps some of his critics could explain how Fontana can exist competitively and not go into default, with a great loss to the government, when the government on one hand sells its Geneva plant to U. S. Steel Corp. at 20¢ on the dollar and compels the competing Fontana plant to pay 100¢ on the dollar, plus interest.

While western steel users are probably flattered by the attention this area is getting this week from the board of directors of the corporation meeting in San Francisco, there are few who expect any startling developments which might relieve the critical sheet situation. There is definite hope that the board's visits to the corporation's plants at Geneva, Utah; Pittsburg, Calif.; Oakland, Calif.; and Los Angeles will afford some opportunity for the men to pick up some-

READER OF THE

Devil's Rainbow

Flickering iridescent flame...burbling, molten bubbles...these are the signs in the devil's rainbow he reads from long experience to tell him when his boiling steel is right.

So, too, it is long experience that counts in designing, building and applying industrial clutches and hydraulic drives...in building power links to defy the heat generated by sudden shock loads and long hours of continuous operation. For 28 years, the Twin Disc

Clutch Company has specialized in this industrial field.

Long experience provides the signs which Twin Disc follows to design, build and apply exactly the right power link for every job. That's why, today, so many manufacturers with power control and transmission problems rely on the impartial, fully qualified recommendations of Twin Disc Engineers!

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin
Hydraulic Division, Rockford, Illinois



SPECIALISTS IN INDUSTRIAL CLUTCHES SINCE 1918

thing of the seriousness of the steel shortage and its effect on local industry. As one unhappy fabricator remarked, "Those men will probably feel like a government commission investigating famine conditions in Europe."

* * *

SALT LAKE CITY—Utah's first "Industrial dividend" in the way of satellite industries for the Geneva steel plant was declared this week with an announcement by Besser Mfg. Co., Alpena, Mich., of plans to establish a concrete block machine manufacturing plant here.

A site, with one building suitable for conversion, has been acquired in the western part of the city and other facilities will be constructed as soon as building materials are available. The firm plans to start manufacturing machine parts here in the near future and, as soon as the plant is completed, will manufacture and assemble complete machines for distribution throughout the 11 western states. The company now has plants in Alpena and Dearborn, Mich., and Birmingham and intends to build one in London, England, in the near future.

SEATTLE—The second installation of a cycloidal propeller proved as successful as the first, as an Army tug, MTL class, was put through a hard set of tows, dead pull, speed and maneuverability trials at Everett, Wash.

Professor Frederick Kirsten, the inventor, has won over a large number of former skeptics with the two demonstrations held within the past few months. The tug performed 360 degree turns without any forward movement, using the bow as a pivot; moved sidewise and in every other direction with speed and ease impossible with the conventional type propeller, according to observers.

The demonstration props were built by Pacific Car & Foundry of Renton, Wash., and the ship work was done at the Everett Pacific yards. Pacific Car holds the exclusive rights to the patents which are owned by Professor Kirsten.

After 25 yr of work on the prop, Professor Kirsten now believes he has demonstrated its practicability to the point where it will be adopted by both commercial ship builders and the Navy.

WAA Tests Possibility Of Removing Pressure Pipe from Army Camps

Washington

• • • War Assets Administration is conducting a second test to determine the feasibility of removing pressure pipe from the ground at surplus military installations for use in the emergency housing program.

It is estimated that approximately 300,000 tons or 30 pct of the total million tons laid down at surplus installations, largely in 6 and 8-in. sizes, can be recovered if such activity proves practical.

The current test is being carried out at Weldon Springs Ordnance Plant in Arkansas, WAA officials reveal. Previously, about 8000 ft of 12-in. pipe had been removed from the ground at the Bluebonnet Ordnance Plant in Texas, using plant maintenance men and surplus digging equipment.

It was estimated by WAA at the time that the cost of the Bluebonnet operation, if conducted by a commercial firm, would have approximated 37¢ a ft. This was believed to be too low and the second test, under somewhat more difficult conditions, was ordered at the Arkansas site.

Pipe at the Bluebonnet plant was purchased and installed at an overall cost to the government of \$4.50 a ft. The pipe removed has been offered on an "as is, where is," basis at a flat price of \$2.25 per ft. Priority claimants will get refusal of all pipe so recovered.

SPORTS TRAILER: This compact trailer was a feature of the third annual World Trade Exposition at Los Angeles. The unit has indirect lighting, carries a full-sized bed, sink, stove and other gadgets and is screened for summer comfort.



CPA Extends Bale Tie Wire

Washington

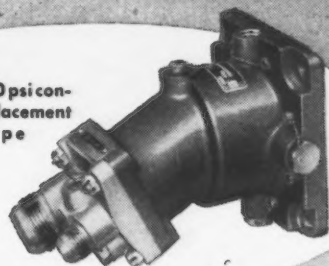
• • • CPA again has extended for 60 days the period during which WAA is required to channel government surplus of bale tie wire to producers of bale ties. This was done, it was stated, to take care of baling requirements of agricultural products, as well as paper and rags.

Under Direction 17 to PR 13, as amended July 26, effective until Sept. 30, WAA was required to set aside, out of government surplus, 7500 tons of carbon steel black annealed or galvanized wire suitable for use in making wire bale ties.

VICKERS Hydraulic Pumps

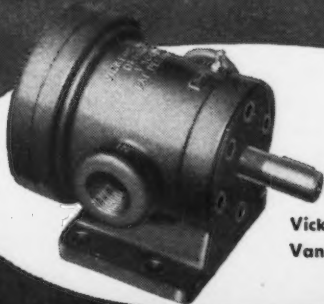


Vickers 3000 psi constant displacement Piston Type Pump



Reliability with minimum weight... greater safety and longer life... are among the exacting requirements of the airlines. It is significant to designers and users of many other types of equipment that Vickers Hydraulic Pumps and Controls are widely used in the 3000 psi hydraulic systems of these huge planes that are literally writing new pages in aviation history.

HIGH IN THE SKY to DEEP IN THE EARTH



Vickers 1000 psi Vane Type Pump

Huge cutting machines depend upon Vickers Hydraulic Pumps and Controls to speed the work and reduce the cost of mining coal. The operator controls the massive machine more easily than you drive your car.

Between these extremes, Vickers Hydraulic Equipment is serving industry in countless ways... wherever accurate, dependable and easy control is needed. In addition to the thousands of more widely known applications on metal working machinery, Vickers Hydraulic Pumps and Controls are used on construction equipment, motor buses, printing presses, agricultural machinery, marine equipment, oil well pumping units, textile and paper machinery, trucks, etc. Vickers Application Engineers will be glad to discuss with you how hydraulics can be used to your advantage.

ENGINEERS AND BUILDERS
OF OIL HYDRAULIC EQUIPMENT
SINCE 1921

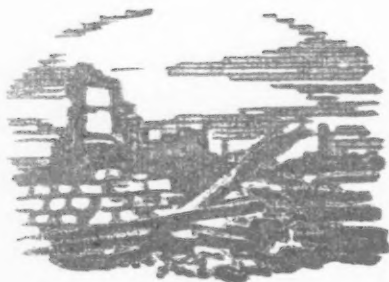
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European Letter . . .

JACK R. HIGHT

• Interest shown by U. S. firms in steel industry in France, Belgium and Luxemburg . . . British Steel Board composed of two steelmakers, two trade unionists, a general industry and a Treasury man and an independent chairman.



LONDON—In the United States there has been considerable interest lately in the present status of the iron and steel industry in France, Belgium and Luxemburg. Apparently this interest stems from the general desire to analyze the future trends in Continental iron and steel imports and to find new markets for heavy steel mill equipment and raw materials going into the making of special or alloy steels.

A recent analysis of the steel picture in those countries mentioned follows:

France: Production of steel ingots and castings in 1938 in France totaled 6,174,000 metric tons, but the industry was actually larger than this figure. Production in 1929 amounted to over 9,700,000 tons of ingots and castings and July steel production amounted to 73 pct of the 1938 monthly average. Big gains have been registered in the June and July production, as operations have been running at less than 50 pct of prewar.

The French industry has a big arrears of modernization work to undertake and is making plans at the present time for such work, with two continuous strip mills contemplated. The trade association of the industry has just been dissolved by government order because it was a Vichy protege, and the industry is suffering from the

backwash of political upheavals that have marked the past year in France. There was virtually no war damage to French steel mills.

The future prospects depend largely on the size of future coking coal allocations from the Ruhr to France (they are almost certain to go down in the next six months), American coal exports to France (slight increase probable) and the allocations of available coal in France to the steel industry. The French Government in the past months has probably given rather less of the available supply to the steel industry than was the prewar practice. Industry is optimistic about coal for the remainder of 1946 for first time since end of war.

Postwar French production costs will be high, and a year of operation at greatly curtailed levels has put the companies in a worse financial plight than they were at liberation.

Luxemburg — Belgium: This industry leans heavily on its export market to dispose of the following prewar production:

Belgium:	4,100,000	metric tons	maximum
(1929)			
	3,800,000	metric tons	(1937)
Luxemburg:	2,700,000	metric tons	maximum
(1929)			
	2,500,000	metric tons	(1937)

Production in Belgium this year has been running between 50 and 60 pct of the 1938 monthly average production, and amounted to 63 pct for July, the last statistics available. Steel production in Luxemburg has been running at slightly less than 50 pct for most of this year, with the latest available production figures for the month of June totaling 114,000 net tons, or roughly 50 pct of the 1937 average. Current production in Belgium is officially earmarked 50 pct for export, despite a strong pent-up domestic demand. Actually, due to the fact that domestic price ceilings are very low by comparison with free market export levels, the total proportion of exports is probably somewhat higher.

Belgians probably hope to expand their total steel capacity somewhat to corner a part of the former German market, but plans are not yet detailed for this expansion. Pro-

duction so far this year has been dependent entirely upon the size of coal allocations to the industry by the Belgian Government, and to Belgium by the European Coal Organization. A secondary problem is labor, but it is relatively unimportant as long as coking coal remains so short.

BIG increases in labor and material costs, as well as the general inflation in Belgium, will lift the selling price of postwar steel far above 1938 levels, but Belgians think they may still be one of the world's cheap steel producers.

Luxemburg depends even more completely upon her export market as the domestic market is very small in comparison to the size of the steel industry. Luxemburg has been a leader in the fight of these three countries to obtain larger coking coal allocations from the Ruhr through the ECO and the North German Coal Control. The need of France and Luxemburg for this coal is more acute than that of Belgium. The Luxemburg industry faces a long-range setback that will come about when the Dorman Long universal beam mill is constructed here in England, as Luxemburg has been the only European producer of this particular product, but this effect will probably not become important for 3 to 5 yr.

Generally speaking the situation for all products made in electric furnaces is substantially easier as in most cases electric power is more available than coking coal. This factor is particularly true in France, where there has been some quantity of hydro power available.

* * *

LONDON—For the Board which is to be charged with the duty of supervising on behalf of the government the modernization and development plans formulated by the iron and steel industry, the British Minister of Supply has chosen two steel manufacturers, two trade unionists, and a representative of general industry, with a treasury man thrown in and an independent chairman from outside. They are all good men, according to report.

Now . . . for

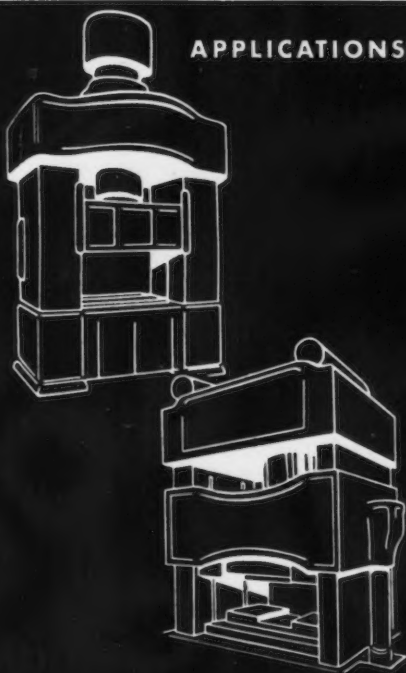
Control

the **FIRST** time . . . you can

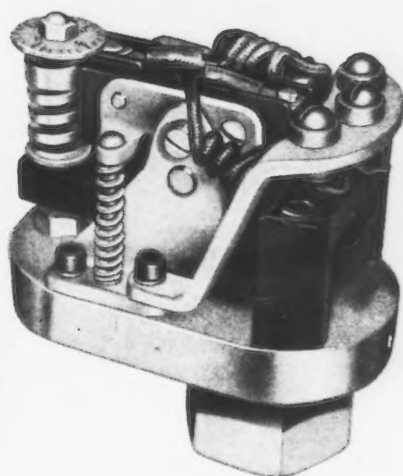
PRESSURES

from 50 to 5000 lbs.
with **ONE** adjustable switch!

APPLICATIONS



The DIAPHLEX X-Press Pressure Switch opens new fields to designers and users of heavy hydraulic presses, pneumatic tools, machinery and high-pressure equipment. It can be used to control actual operation, to monitor protective devices, to actuate a safety warning or alarm signal. Obvious uses are on large drop hammers, draw presses, forging equipment, machine tools, high-pressure process equipment and pipelines. Perhaps the requirements of your plant or products will suggest others.



THE NEW X-PRESS PRESSURE SWITCH by DIAPHLEX permits closer control of higher pressures than has yet been possible. Adjustable and sensitive from 50 to 5000 pounds per square inch of gas or liquid pressures, the X-Press is unusually compact and sturdy.

DESIGN CHARACTERISTICS

- 1 Operating pressure range 50 to 5000 psi.
- 2 Operating pressure differential less than 10% over entire range.
- 3 Instant dial adjustment at operating pressures.
- 4 Operates on pneumatic or hydraulic pressure impulses.
- 5 Sensitive and accurate within $\frac{1}{2}$ of 1% over entire range.
- 6 Compact: only $3\frac{1}{2}$ " long x 2" wide by 4" high; weighs only $2\frac{3}{4}$ lbs.
- 7 Enclosed snap action contacts; dustproof and splashproof.
- 8 Rugged: will withstand rough handling and surge pressures up to 6000 psi.
- 9 Threaded pipe pressure connection; Amphenol or conduit electrical connection.

The X-Press is but one of a complete line of pressure operated switches by DIAPHLEX. This division of Cook Electric Company is devoted to the design and production of precision products operated by the flexure of Cook's patented Spring-Life Bellows Diaphragms. You are invited to discuss your pressure control problems with the nearest Cook field engineer, or to write for further information. Please outline your requirements, and request Booklet 604

DIAPHLEX

division of **COOK ELECTRIC COMPANY** Chicago 14
Sales and engineering offices in principal cities.

Sir Archibald Forbes, 43, has been appointed chairman of the Board. His forte is accountancy. A director of Spillers, Ltd., the big milling concern, and other companies, he is an inside administrator rather than a market or trading man. He is credited with useful organizing ability. A former member of a firm of chartered accountants, he became a director of Spillers in 1935, was released in 1940 to join the Air Ministry, was appointed Deputy Secretary of the Ministry of Aircraft Production in 1941. Subsequently he took over also the post of Controller of Repair, Equipment and Overseas Supplies.

Sir Archibald will be paid \$34,000 a year. His appointment is full time. All the other members of the Iron & Steel Board have part-time appointments only. They are: Sir Alan Barlow, A. Callighan, Lincoln Evans, G. H. Latham, and R. Mather. An additional member who is to have experience of general industry, has yet to be appointed.

Lincoln Evans is general secretary of the Iron and Steel Trades Confederation, which is the national trade union of the industry. He is a member of the General Council of the Trades Union Congress. Mr. Evans is an able man, typical of the modern school of union leader,

more concerned with looking after the interests of his own union and doing his own particular job of work well than with extremes of socialist ideology.

A. Callighan is secretary of the Blastfurnacemen's Union and a man of similar type.

G. H. Latham ranks as one of the most able steel men in this country. Starting in the works, he has had over 40 yr experience with the Whitehead Iron & Steel Co., Ltd. of which he is now chairman and managing director. He also acted for a period as managing director of Richard Thomas & Co., Ltd. He is president-elect of the British Iron & Steel Federation, a vice-president of the Iron & Steel Institute, and technical adviser for the steel industry on the Finance Corp. for Industry, Ltd.

Richard Mather is chairman and managing director of the Skinninggrove Iron Co., Ltd. He was technical adviser to the Indian Tariff Board in 1923-24 and again in 1926-27, and was technical director of the Tata Iron & Steel Co. from 1930-40.

Sir Alan Barlow is a Joint Secretary of the Treasury.

THE Board's main duties are laid down as follows:

(1) To review and supervise programs of development needed

for the modernization of the iron and steel industry and to watch over the execution of approved schemes in such programs.

(2) To supervise as necessary the industry in current matters, including the provision of its raw material requirements, and the administration, under powers delegated by the Minister, of such continued direct control as may be required over the production, distribution and import of iron and steel products.

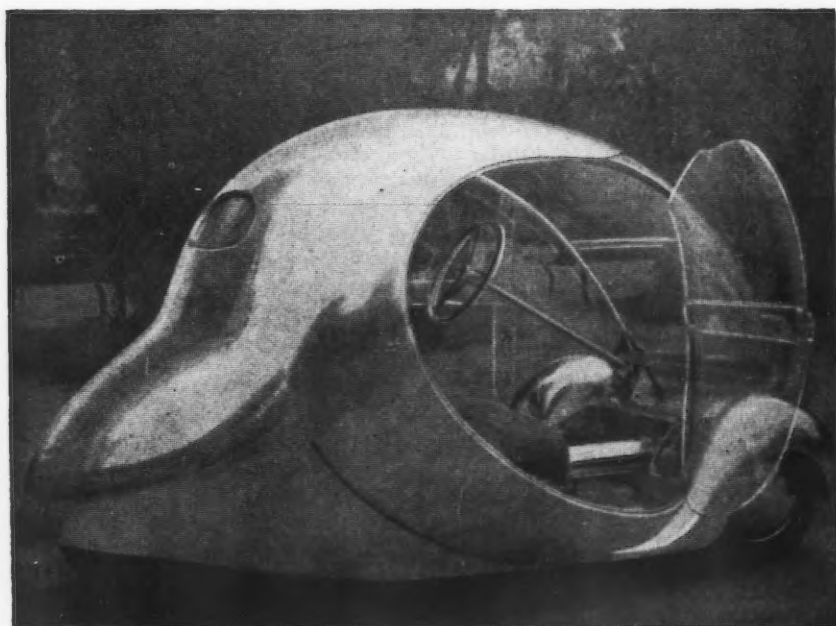
(3) To advise on general price policy for the industry and on the fixing of prices for controlled products.

This is not exactly the kind of Iron and Steel Board the Minister of Supply seemed to envisage last April when he announced the government's intention to nationalize the British iron and steel industry. He spoke then of a "Control Board" which would "replace the existing Iron and Steel Control and will be responsible to me for the general control and supervision of the industry during the period which will be necessary for the preparation and putting into effect of the scheme of public ownership." But he did not find it easy to get men to serve on such a board.

The steel makers refused to play. They did not feel called upon themselves to pull the rope that Mr. Wilnot had cast about their necks. The government invited Dr. H. J. van der Bijl to leave the South African steel industry for a time and become chairman of the British board of control. But the Doctor could not see his way clear. Finally the government decided that it should not be part of the functions of the Board to advise in connection with plans for public ownership, but that it should concentrate on the development and reconstruction of the industry. On this understanding the British Iron & Steel Federation consented to associate itself with membership of the Board.

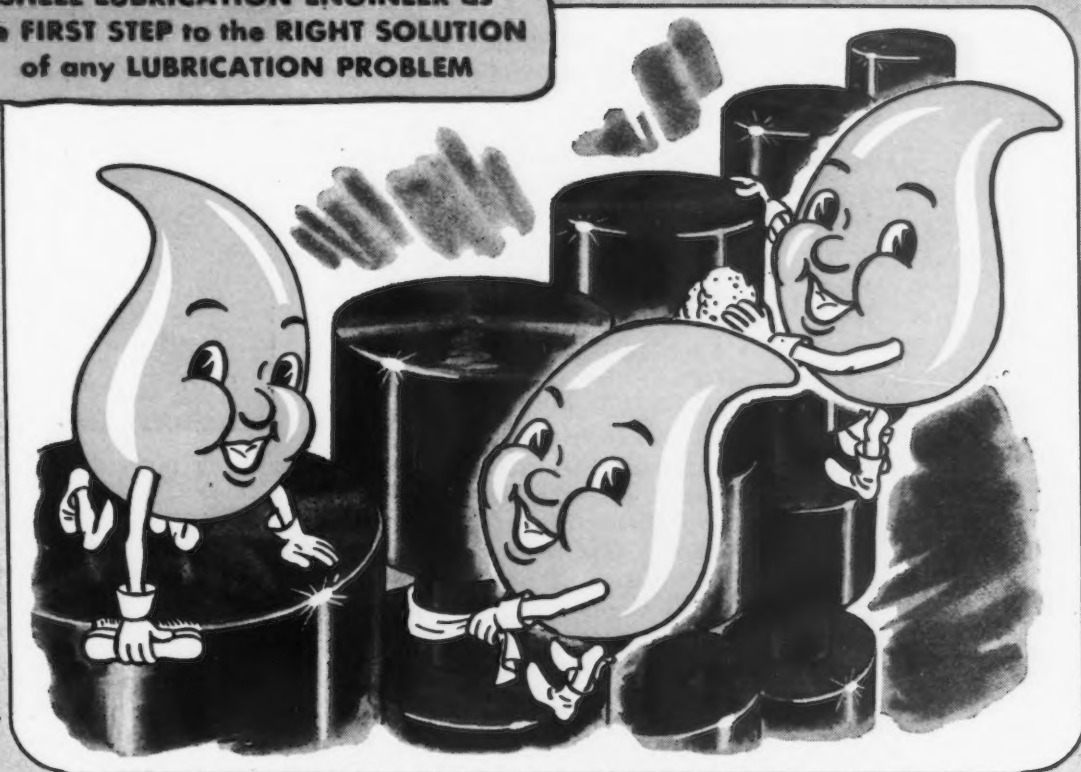
Now the Board has been constituted. The government has appointed a man of its own choice as chairman, it has a member of the Civil Service on the Board. The member still to be appointed presumably will watch the interests of the consumer. The trade unions have two members, the steelmakers have two. Which does not give the present owners exactly a majority.

ELECTRIC EGG: A Parisian inventor has attacked the gas shortage with this tiny aluminum car weighing but 132 lb without its batteries or motor. Complete with 530 lb of batteries and all accessories it weighs only 770 lb. It will run 60 miles at 35 mph, without recharging, carrying a driver and passenger, according to the French *Revue de L'Aluminium*.





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SHELL HYDRAULIC OIL STOPS VALVE STICKING

PROBLEM: Valves were sticking in the hydraulic control system of an automatic boring machine. Lacquer and gum formations were clearly responsible, but operators could find no way to stop it. Cleaning the system once and sometimes twice each week seemed to be the only way to keep the unit in service.

SOLUTION: When the Shell Lubrication Engineer surveyed the problem, he made two recommendations:

1. A thorough cleaning of the system, following a procedure and using special materials developed by Shell.

2. The use of a Shell Tellus Oil, one of several Shell hydraulic oils specially refined to retard oxidation and rusting.

At the end of two months, no sign of valve sticking had occurred. The operators were reported to be completely satisfied.

CONCLUSION: It pays to consult the Shell Lubrication Engineer, regardless of the nature or size of your lubricating problem. For informative literature on Hydraulic Oils, write Shell Oil Company, Incorporated, 50 West 50th Street, New York 20, New York or 100 Bush Street, San Francisco 6, California.

SHELL HYDRAULIC OILS



PERSONALS



CLEVE H. POMEROY, president, National Malleable & Steel Castings Co.

• **Cleve H. Pomeroy**, vice-president and secretary-treasurer of National Malleable & Steel Castings Co., Cleveland, has been elected president succeeding the late Charles H. McCrea. Mr. Pomeroy has been with National Malleable since 1920. Originally credit manager, he was advanced to assistant treasurer, treasurer, secretary and treasurer, and was elected vice-president in charge of finances and accounting in 1944. He has also been a member of the board of directors since 1938. He will retain his duties as treasurer, in addition to the presidency. **A. E. Field**, assistant secretary, has been elected secretary.

• **August F. Paeschke** has been elected president of Geuder, Paeschke & Frey Co., Milwaukee, succeeding **Henry F. Millmann**, who becomes chairman of the board. **Curt E. Hoerig** and **Lloyd R. Mueller** have been made vice-presidents. Mr. Paeschke, recently discharged from the Army, has been with the firm since 1936 and has been vice-president since 1945.

• **J. W. O'Brien** has been appointed chief engineer of the United Engineering & Foundry Co., Pittsburgh. Mr. O'Brien, formerly assistant chief engineer, has been associated with the company for 13 yr. **Howard N. Fry**, who has 24 yr of service with the company, has been appointed assistant chief engineer.

• **Norman R. Stiles** has been elected president and treasurer of the Chisholm-Ryder Co., Inc., Niagara Falls, N. Y. He succeeds the late **Stephen M. Ryder**. Mr. Stiles, who served in the Coast Guard during the war, returned to Chisholm-Ryder this year to assume the position of assistant to the president.

• **Louis R. Popp** has been elected president and general manager of Pierce Renewable Fuses, Inc., Buffalo. Formerly vice-president of the company, he succeeds **William Brennan, Jr.**, who becomes chairman of the board. **Arthur M. Popp**, formerly factory manager, has been elected vice-president and general works manager; **M. Dorothy Popp**, secretary and treasurer, and **D. O. Granger**, general sales manager.

• **J. W. Burdick** has been named sales manager, New York district, for the Washington Steel Corp., Washington, Pa. He will maintain a temporary sales office in Hartford, Conn. Mr. Burdick has been associated with the steel industry since 1932 and has been with steel sales work in the New York and New England district since 1938.

J. W. BURDICK, sales manager, New York district, Washington Steel Corp.



ROBERT POTTER, manager, Rolling Mill Div., E. W. Bliss Co.

• **Robert Potter**, formerly chief engineer of the Rolling Mill Div. of E. W. Bliss Co. in Salem, Ohio, has been appointed manager of this division. Prior to his joining the Bliss organization in January of this year, Mr. Potter was chief engineer of Superior Steel Corp.

• **J. E. Fifield** has joined the Development and Research Div. of the International Nickel Co., Inc., New York. He will make his headquarters at the New England technical section of the division at Hartford, Conn. He was formerly with the American Manganese Steel Div. of the American Brake Shoe Co., where he was employed as plant metallurgist, and more recently served as assistant to plant manager and foundry metallurgist in the U. S. Naval Research Laboratory in Washington.

• **V. E. Cribbs** has been appointed assistant to director of personal relations and **Ralph J. Wright** has been appointed assistant to the manager of the Middletown Div. of the American Rolling Mill Co., Middletown, Ohio. Mr. Wright joined the organization as a messenger in Armco's main office in 1917. Until his recent promotion, he was assistant supervisor of personal relations. Mr. Cribbs' first connection with Armco was in 1920, as a laborer in the East works shipping dept. He was assistant to the works manager of the Middletown Div. at the time of his present advancement.



R. J. LECKRONE, chief engineer in charge of engineering and machinery sales, Pittsburgh Steel Foundry Corp.

• **R. J. Leckrone** has been appointed chief engineer in charge of engineering and machinery sales of the Pittsburgh Steel Foundry Corp., Glassport, Pa. He comes to PSF from the Lewis Foundry & Machine Div. of the Blaw-Knox Co., which he served for the past 8 yr in the capacity of chief designing engineer. Previous to that, Mr. Leckrone was affiliated with the now Continental Foundry & Machine Co. of Pittsburgh, as a special engineer. In his association with Pittsburgh Steel Foundry, he will head the company's engineering activities for both its plants, at Glassport and McKeesport, Pa., as well as its sales activities in the general machinery field. His headquarters will be maintained at Pittsburgh.

• **T. L. Kishbaugh** has become associated with the new Los Angeles plant of Joseph T. Ryerson & Son, Inc. He has been identified with the warehouse steel business since 1930 when he joined the Earle M. Jorgensen Co. of Los Angeles where he served successively as salesman, manager of sales, vice-president and general sales manager and, for 2 yr prior to his resignation early in 1946, vice-president and merchandising manager. At one time he was connected with the Bethlehem Steel Co., spending a number of years at their Johnstown, Pa. rolling mills.

• **Kenneth A. Helmly** has been promoted to the position of manager of mail order sales for Southern States Iron Roofing Co., Savannah, Ga. He succeeds **E. C. Boyce** who has been advanced to director of advertising for Southern States. Mr. Helmly has been with the company since 1938. Returning to Southern States upon his release from the Air Corps, he entered the sales dept., advancing to the position of assistant manager of Mail Order Sales Div., the post he held until his present promotion to manager of this division.

• **M. T. Herreid**, vice-president of Koppers Co., Inc., Pittsburgh, has been appointed manager of Koppers plants at Granite City, Ill., and St. Paul, Minn., and vice-president **J. F. Byrne** has been appointed on special assignment for the Engineering & Construction Div. Mr. Herreid will maintain his offices at St. Paul and Mr. Byrne in New York. Other appointments include those of vice-president **Stanley N. Brown** as manager of the new finance dept., vice-president **J. N. Forker** as general manager of the new Tar Products Div., vice-president **Dan M. Rugg** as general manager of the new Chemical Div., and vice-president **W. Reed Morris** as general manager of the new Gas & Coke Div. **George M. Walker** has been named manager of the new control section.

M. T. HERREID, manager of Koppers Co., Inc. plants at Granite City and St. Paul.



FERDINAND H. RAAB, industrial relations manager, Copperweld Steel Co.

• **Ferdinand H. Raab** has been appointed industrial relations manager of Copperweld Steel Co., Glassport, Pa. He was formerly manager of personnel and industrial relations for the American Aircraft Co. at Dayton, and later the Standard Dayton Corp., also of that city.

• **James D. Platt** has been appointed New York zone manager of the Packard Motor Car Co. He joined Packard in 1945 as assistant zone manager, and succeeds **Charles F. Hoffman**, who has resigned to take the Packard dealership in Newark, N. J., after 31 yr of service with the New York Packard organization. **M. J. Heiler** becomes assistant New York zone manager succeeding Mr. Platt.

• **George T. Collins** has been named manager of the market research dept. of Pennsylvania Salt Mfg. Co., Philadelphia. Mr. Collins, formerly a chemical engineer in the department, was assistant manager of market research when he was promoted. He joined the Pennsalt organization in 1943.

• **Alfred W. Dodd**, vice-president of the American Zinc, Lead & Smelting Co., St. Louis, will resign as of Oct. 1. He has been connected with the company and its subsidiaries during the past 30 yr, and served in the capacity of eastern manager of sales, vice-president and director.

• **Walter J. Bemb** has been named vice-president of Houdaille-Hershey Corp., Detroit. For the past 44 yr Mr. Bemb has been continuously identified with the automobile industry as distributor, dealer, factory representative and in special merchandising activities.

• **Horace D'Angelo** has been appointed executive vice-president of Harry Ferguson, Inc., Detroit.

• **C. W. Baker** has been made assistant chief engineer of the Lewis Foundry & Machine Div. of Blaw-Knox Co., Groveton, Pa. He has been on the engineering staff of Lewis Foundry & Machine since 1929.

• **William Dean** has been appointed safety director of Morse Chain Co., Ithaca, N. Y. He comes to Morse Chain from Ithaca Gun Co. where he has been safety director for a number of years. Temporarily, he will continue to serve Ithaca Gun in a consulting capacity.

• **Albert A. Bauer** has been appointed district representative in Philadelphia for the Sawhill Mfg. Co., Sharon, Pa.

• **S. J. Beatty, Jr.** has been named assistant sales manager in charge of the Gradall Div. of Warner & Swasey Co., Cleveland.

• **A. U. Fox** has been named chairman of the board of directors of Mathieson Alkali Works, Inc., New York. He has recently been deputy director of the Finance Div. of the U. S. Military Government in Germany.

• **Laurence S. Andrich**, vice-president and general manager of Snyder Tool & Engineering Co., Detroit, died Sept. 10 after a long illness. He joined Snyder in the capacity of draftsman in 1928 and rose rapidly in the organization, holding many responsible positions and for a number of years was vice-president in charge of sales and engineering.

• **Martin Goebel**, 80, former head of the metal scale graduating dept. of the Taylor Instrument Co., Rochester, died recently. He was employed by the firm for 57 yr, retiring in 1939.



V. J. PAZZETTI, Jr. (left), and J. A. TAYLOR (right), assistant general managers, Bethlehem Steel Co.

• **A. D. Shankland**, assistant general manager of Bethlehem Steel Co., Bethlehem, Pa., has been transferred to the staff of Quincy Bent, vice-president. **V. J. Pazzetti, Jr.**, superintendent, Saucon Div. and **J. A. Taylor**, chief engineer, have been appointed assistant general managers. **S. D. Gladding**, superintendent, Alloy & Tool Steel Div., has become superintendent of the Saucon Div., and is succeeded by **Ralph E. Knerr**, assistant superintendent. **J. A. Bell** succeeds Mr. Taylor as chief engineer.

• **Frank A. Maley**, formerly with the Curtiss-Wright Corp.'s Airplane Div., has joined Bell Aircraft Corp., Buffalo, as purchasing agent, succeeding **Hugh A. Holmberg**, who has resigned.

• **Walter F. Borges** has been appointed sales manager of the Wrought Washer Mfg. Co., Milwaukee, succeeding the late William F. Disch. Mr. Borges will also be in charge of advertising. He has been associated with the company for 12 yr in various sales capacities.

• **James R. Reed** has been named manager of the commercial research dept. of the Allis-Chalmers Mfg. Co., Milwaukee. Other department appointments are **Jerome F. Fitzsimmons** as supervisor in charge of research and **Anson J. Bennett, Jr.** as supervisor in charge of sales analysis. Mr. Reed has been with Allis-Chalmers in statistical capacity since 1941. Mr. Fitzsimmons joined the concern in 1943, and Mr. Bennett has been with the company nearly 3 yr.

...OBITUARY...

• **Brownrigg L. Norton**, 45, assistant vice-president and eastern representative of the Scullin Steel Co. of St. Louis, with offices in New York, died recently.

• **John J. Wharam**, chief passenger car engineer for the Ford Motor Co., Dearborn, Mich., died recently following a brief illness. He joined Ford in 1921 and has held various executive posts in the engineering dept.

• **Fred O. Volz**, 49, vice-president and sales engineer for the Lakeside Bridge & Steel Co., Milwaukee, died Sept. 6.

• **Philip Hirschberg**, 81, associated with the David Hirschberg Scrap Co., Lockland, Ohio, died Sept. 9 following a week's illness.

• **Dr. Gilbert E. Seil**, 57, chemist and metallurgist, died recently. He was a technical consultant for Day & Zimmermann, Inc., Philadelphia, and was technical director of E. J. Lavino & Co., Plymouth Meeting, Pa.

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Dear Editor:

IN DEFENSE OF WELDING

Sir:

Arc welding has been of decisive importance to America. Arc welding did more than most other manufacturing processes in the producing of the tools of war during World War II. Arc welding has produced a record for reliability in billions of welds, made over many years, that is unmatched by any other manufacturing process, yet arc welding is tremendously handicapping its application, and promises still more to interfere with its future use.

This attack is aimed not at the process, as such. It is obvious such tactics would fail. The attack consists in throwing suspicion on the process by writing into specifications expensive and impractical tests which have little to do with the excellence of the weld. Most of them have to do with infinitesimal variations of no possible importance, but of great cost. The attack has already eliminated the economic use in many proper applications. If continued, it will soon eliminate many others.

We see, for instance, the ruling that welds must be X rayed, which increases the cost by several times, yet the commercially welded joint is always of greater strength than the parent metal and is tremendously stronger than any riveted joint, where X raying never has been suggested.

We see riveted joints which are made tight by caulking. This process is accepted without question. The resulting undercut is enormous, yet a welding undercut that is infinitesimal is frequently made the reason for rejection of welds.

We see welds chipped out, rewelded, and welded vessels rejected because of trifling defects such as infinitesimal porosity either on the surface or beneath, yet parent metal in the same structure with defects much greater, and whose weakening effect would be tremendously more serious, are accepted without question.

We see welding electrode specifications being written which enormously increase the cost of production with no increase in either the reliability nor in the excellence of electrodes. Rivets have no such test to handicap them.

While a welding electrode is tested in every conceivable and nonsensical way, no one suggests any test on a rivet, yet the riveted joint is always the weakest spot in any structure. This is never true of a full-sized welded joint.

Much time and expense is used in testing electrode deposit to make sure it has great ductility and the weld is rejected if the ductility is low, yet riveted joints have no elongation and are accepted without question. The contour of the deposit of a weld is a matter of very close inspection, yet no one examines the contour of any rivet or the hole it only partially fills.

All insured vessels must have their welds X rayed and any weld is rejected if any infinitesimal defect is found, yet no one X rays a riveted joint nor rejects it because of the voids between the rivets and the rivet holes which are known to be always present.

Because of the higher elastic limit of the weld metal, there is no load that can be put on a welded structure in which the weld is of equal or greater section than the parent metal which can affect the weld in any possible way until great distortion of the rest of the structure has taken place. Such distortion would make that structure valueless for its intended purpose, yet all this testing and rejecting listed above is made mandatory in many welded structures—never in riveted structures. Further instances of the same kind can be cited by the scores. The examples shown are sufficient for the author's purpose.

Welding over the years has done a more reliable job than the rivets it has replaced. That record is conclusive. The engineering profession, which relies so completely on welding in so many cases, must recognize and resist this studied attempt to eliminate the arc welding process. The attack has already eliminated the economic use of welding in many structures. The success of such an attack on this tremendously valuable method is neither good advertising for the engineering profession nor good ethics for those involved in the attack. It is time we dealt with reality.

J. F. LINCOLN
President

Lincoln Electric Co.
Cleveland

FORGING ROUNDS

Sir:

We will appreciate it very much if you will send us five reprints of the article on "Forging High Alloy Rounds with V-Type Dies," which was printed in the Aug. 1 issue.

C. J. TAYLOR
Assistant Manager

Columbia Tool Steel Co.
Chicago Heights, Ill.

TRACK BOLT PRICES

Sir:

The issue of Aug. 8, p. 125, gives the price for track bolts, heat treated to railroads, as \$5 per 100 lb, plus 12 pct, while the following issue states the price as \$6.75. Will you kindly advise as to how the \$6.75 is made up, as we cannot reconcile same with the previous \$5 plus 12 pct, which would be \$5.60.

G. W. CODDINGTON

Dominion Steel & Coal Corp., Ltd.
Montreal, Canada

● Both prices were correct. Major track bolt manufacturers on about Aug. 12 raised quotations to the levels quoted in the issue of Aug. 15. OPA decontrolled railroad track bolts on July 26, but the old price of \$5 plus 12 pct was held until Aug. 12.—Ed.

PUZZLER

Sir:

Our class in occupation would like as much free material as you have available and which you think would be helpful to us.

HERMAN WISER

Route No. 1
Leachville, Ark.

● Assuming that you're interested in details of various occupations in the metal working industry, we are forwarding you copies of a number of articles which cover this phase rather well. Your best source of additional information would be the Div. of Occupational Analysis, U. S. Employment Service, Washington. This division issues booklets describing individual occupational requirements. The Aluminum Co. of America has recently published a booklet entitled "The Aluminum Industry," which lists in detail the occupations found in the aluminum industry.—Ed.

WIRE ROPE MACHINERY

Sir:

I am representing a European firm which would like to purchase additional machinery for the manufacture of wire ropes. Kindly let me know whether you can supply me with names and addresses of these manufacturers.

S. A. EDWARDS

Brooklyn

● We are forwarding you the names of several wire rope machine manufacturers.—Ed.

X RAY CASTING INSPECTION

Sir:

The article entitled "Radiographic and Fluoroscopic Interpretation of Casting Irregularities" by Thomas E. Piper which appeared on pp. 4 through 49 in the May 2 issue was of considerable interest to us. Will you please send us a copy of the article.

R. G. TOBEY
Xray Dept.

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This Industrial Week . . .

- **Steel Rate at All-Time Peace Level**
- **Scrap Problem Still With Industry**
- **Nonferrous Shortages Impede Steel Use**

STEEL ingot output this week was rolling along at the highest peacetime level in the nation's history and was not far below some of the peak levels during the war years. Current output, if figured on an annual basis without interruptions due to strikes and scrap shortages, would produce more than 83 million tons of steel in a year's time or roughly one-third more than was produced in 1929 when the industry made 63 million tons of steel, the all-time prewar record.

Steel ingot operations this week were up 1½ points to 90.5 pct of rated capacity and despite the immediate scrap situation it is expected that the industry will be able to maintain output at this fast clip for at least the next several weeks. Statistically, the month of October has always been one reflecting an upsurge in steel output and this year no exception to this rule is expected.

Nevertheless, for the long pull covering the coming winter months the serious scrap outlook may bring forth an obstacle to a continuation of the high ingot operating rate because of a new scrap crisis. This week most steelmakers were painfully finding out that the so-called clarification of the scrap price controversy neither cleared the air nor produced the flow of scrap which had been anticipated.

Despite efforts of the OPA to settle the matter once and for all with a definite statement its action in turning down the scrap industry's request for higher prices has apparently served to slow up collections and shipments from dealers throughout the country. Although steel mill purchasing agents are becoming frantic in their attempt to supplement their dwindling scrap supplies and finding little success in doing so, some scrap dealers insist that scrap is available but not at present prices. They point to the small supplies in their yards as proof that scrap is not coming out from original sources at today's quotations.

ON the other hand scrap coming from manufacturers' plants direct to steel companies has increased considerably in the past month and it may be that some of this scrap is by-passing normal dealer channels because of steel companies insisting that unless scrap is obtained quickly a drop in steelmaking is in prospect.

The practice of putting pressure on consumers to get their scrap back to the mills is, steel officials claim, not connected with a so-called tie-in sales whereby specific scrap shipments are related to specific shipments of finished steel. This greater volume of production scrap from manufacturing centers, plus the continual increase in the percentage of hot metal in the openhearth has so far enabled steel companies with few exceptions to maintain exceedingly high levels of output.

The dark spot on the current outlook, however, involves the inability of steel companies to lay up scrap for use this Winter when weather conditions

normally restrict both the collection and the shipment of scrap to and from dealers yards. The success of the current efforts of the steel industry, steel consumers and the scrap trade to expand the volume of scrap over the next few months will determine whether or not present high output can be continued into the Winter months.

REPORTS in the trade and among steel users that a steel shortage of substantial proportions now exists are not only misleading but are really "begging the issue." While it is true that deliveries are far behind and that consumers cannot obtain all the steel they claim they require, there are fundamental reasons for these conditions which do not indicate a general shortage of either capacity or steel production. Rather there is a temporary shortage of certain types of steel during a compressed period of time when practically everyone wants what he thinks he needs yesterday.

The current steel demand includes requirements to take care of products not produced during the war as well as requirements for normal replacements and repairs. Superimposing steel demand, which reflects the manufacture of products which have not been made for many years and which the public is said to be clamoring for, upon a relatively high demand for ordinary replacement and repair has produced a temporary situation which could not be met even though capacities and output were to be expanded at a terrific rate.

This temporary tightness in steel deliveries is expected to be relieved considerably by June, 1947, or sooner. In the meantime steel stocks in the hands of consumers are greatly unbalanced and once the "hard to get" products are obtained, the finished producer or consumer goods available to the public will be far greater than is now generally supposed.

DESPITE denials, there appears also to be ample reason for believing that a considerable quantity of steel is being ordered today as a hedge against possible steel price increases both before and after the OPA goes out of existence. Having even more bearing on the so-called steel shortage problem is the fact that nonferrous metals are restricting the use and output of finished steel in the manufacture of finished producer and consumer goods.

It is estimated that 250,000 short tons of refined copper has been lost in the past 7 months due to strikes, and the after-effects are reflected in the exceedingly long delivery promises on motors and electrical equipment necessary to complete many manufactured items. In addition to copper the critical lead situation is making itself felt throughout industry and particularly has threatened shutdowns in the automobile industry. While these shortage factors exist and prevent the completion of finished products, large tonnages of steel are being shipped daily and stored until a balance is obtained in the mass producing industries.

STEEL CONSUMPTION—While finished steel capacity is gaining constantly by mill speed-ups and the addition of new facilities, many of which won't be in production for another year, some observers feel that the serious shortage of nonferrous metals will limit steel consumption in the next 4 yr. This shortage is getting constantly more difficult. Reserves of copper, lead and zinc are being depleted and the cost of extracting the ores is constantly going up. Even with government subsidies during the war, the available metals, domestic and imported, fell off. With reconstruction going on throughout the world, competition for foreign supplies will be keen and greater dependence will be necessary on diminishing domestic reserves. Actually, steel consumption and nonferrous metal consumption are dependent upon each other, and the shortage of the latter may well limit steel requirements.

PIG IRON—Steel mill iron melts during September are keeping up with the high output of August and in some instances actually exceeding it. The shortage of scrap has forced mills to push iron output to its ultimate, and one mill here reports that its openhearth charge is running approximately 65 pct iron. This, with a 28 to 30 pct home scrap charge means that purchased scrap is only accounting for 5 to 7 pct of the melt. The expected ease in scrap has not yet started, but the high iron requirements have noticeably affected foundry supplies.

AUTO INVENTORIES—Despite the shortages, the automobile industry is reported to have more money invested in inventories than at any other time in its history, the total dollar value being several times normal. In part, this increase is due to purchase of materials in anticipation of two working shifts which has not materialized. The job of balancing its inventories remains just about the toughest assignment facing the motor industry today.

LOW ALLOY HIGH TENSILE STEEL—One of the steel products which has not been on a quota basis—namely, low alloy high strength sheets or plates, may soon be reconsidered. Should CPA order steel for car building construction or repair as allocated tonnage, the deliveries on this product will move forward considerably. How far this trend will go depends on the percent of high strength steel covered by the present orders from the railroads that are already on the producers' books.

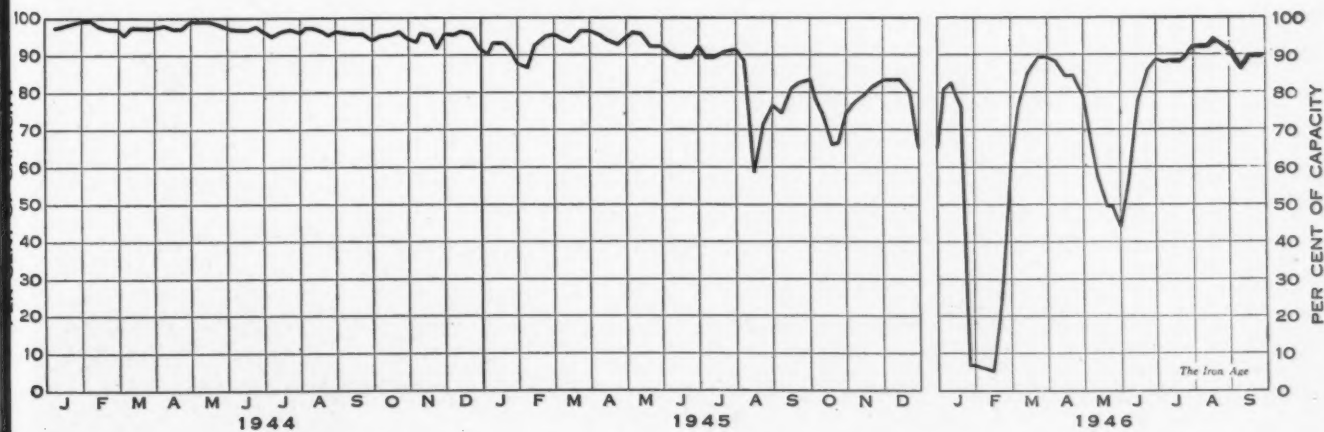
MORE STEEL FOR AUTOS—Today's automobiles require more steel than any previous models. Roomier bodies and larger bumpers, the installation of air conditioning equipment and other changes have pushed total steel requirements per car up to a new high. In the case of one high priced car, today's model requires 400 lb more steel than its predecessor. A substantial part of this weight has been added, it is said, in the air conditioning system.

ELECTRICAL SHEET OUTLOOK—The electrical sheet supply situation, especially in motor grades, is probably the most difficult of any steel classification. The low silicon grades are in heavy demand for fractional horsepower motor production as well as small unit power generator and transformer use. Books have not been opened by producers for the first quarter, but mills indicate that there are many orders on hand that have not been entered. Priority orders have been heavy, hitting many normal consumers. Some suppliers have gone out of production on electrical sheets, mainly because even past price increases granted by OPA do not permit them to meet costs.

FOUNDRY PRODUCTION—CPA certifications of foundry output has hit many foundries in that their organization is not elaborate enough to closely follow all the developments coming out of Washington. Foundry iron suppliers report that many of them were unaware or vague on the certification plan. Some were pushed to the wall on iron in September because suppliers couldn't ship to foundries without certifications and many foundries had not obtained any certifications whatsoever. Consequently, when they came to furnace operators with their normal September iron requirements they found that they had to quickly arrange to get certifications or do without iron.

GERMAN PRODUCTION—Ingot output in the British occupied zone of Germany for July totaled 210,321 metric tons, and rolled products totaled 181,200 metric tons. These figures, which substantially exceed the best previous month are due largely to an increase in coal allocation to the steel industry. In contrast to the earlier position, the labor supply now becomes the controlling factor on steel production, rather than coal.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
September 17...	100.0*	90.5	87.0	82.0	96.0*	102.0	96.0	99.0	95.0	73.0	88.0	58.0	100.0	89.0*
September 24...	101.0	91.5	87.0	82.0	97.0	102.0	96.0	99.0	96.0	73.0	96.5	67.0	100.0	90.5

* Revised.

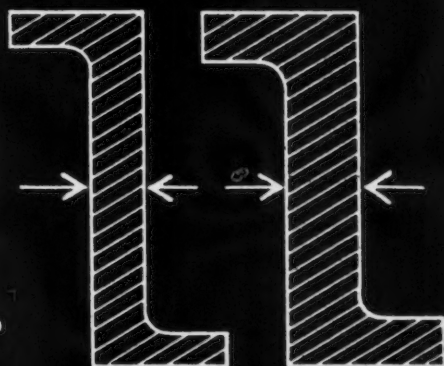
THE NEW ARITHMETIC IN STEEL

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GREAT LAKES STEEL CORPORATION

LIGHTER SECTIONS

= LESS STEEL PER UNIT

= MORE UNITS PER TON



THIS NEW ARITHMETIC SHOWS USERS OF HOT AND COLD ROLLED SHEETS HOW TO INCREASE PRODUCTION OF UNITS 33% WITH THE SAME AMOUNT OF STEEL

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N-A-X ALLOY DIVISION • DETROIT 18, MICHIGAN
UNIT OF NATIONAL STEEL CORPORATION

Wyatt Launches Bonus Plan for Increasing Pig Iron Output

Washington

• • • Consisting of bonus payments of \$8.00 a ton to operating furnaces for all production in excess of set quotas and \$12.00 a ton to operators of reopened and new furnaces for one-half of their monthly production, the National Housing Agency's ninth premium payment plan was launched on Sept. 18 by Housing Expediter Wilson W. Wyatt.

Briefly the program general follows the plan as outlined here two weeks ago (*THE IRON AGE*, Sept. 12, p 110). Agency officials optimistically hope to boost production of foundry and malleable grades of pig iron by one-third.

The base period for establishing quotas will be Jan. 1 to Aug. 31, 1946, inclusive, and the payments will be retroactive to apply on all production since Sept. 1. The program is scheduled to end June 30, 1947.

While producers of basic pig iron (as well as bessemer, high silicon and low phos grades) are not directly eligible for bonus payments, foundry and malleable producers are authorized to cut basic producers in on the program indirectly by transferring basic pig iron orders from their own regular customers to steel grade producers—paying the basic producers a bonus of \$2.00 a ton for all such orders shipped.

Since this, in effect, is the equivalent of a price increase of \$2.00 a ton—being paid out of the \$8.00 bonus received by the foundry-malleable operators—to basic producers for all such orders fulfilled, OPA has found itself compelled to amend its pricing regulations to conform to the NHA program, thereby lifting from such transactions the stigma of price violation.

This shifting of orders, housing officials explain, permits malleable and foundry producers to devote their full furnace capacity to the type of production required to meet housing needs without the impact being felt by other consuming industries.

A double-check is attempted in

By KARL RANNELLS
Washington Bureau

order to guard against willful violation of the intent of the order.

An operator who transfers basic pig orders from his regular customers over to a basic producer is prohibited from paying bonuses (\$2.00) on a greater quantity than he normally shipped each month before the plan became effective; nor may the basic producer accept or ship bonus orders in such amounts as to cause a reduction in the amounts, or otherwise interfere with, normally shipped to his regular customers.

Mr. Wyatt vigorously denied that his housing program is taking an undue proportion of the pig iron supply. He declared:

"The facts are that in August only 130,000 gross tons were assigned producers of housing type items or about a third of the anticipated shipments to foundries during the month, and a considerable amount of these items went into essential non-housing construction. It should be remembered that a large portion of the 130,000 tons represents the normal take for housing whether there had been a housing program or not."

Monthly quotas for an operating plant will be based on 80 pct of its merchant pig production during its highest month or the average of its three highest months, whichever is lower, during the base period. If a plant operated during the base period for less than 3 months, its quota will be figured on the months it was in actual op-



BRICKBAT CATCHER: Wilson W. Wyatt in charge of getting housing for ex-GI's, is the focal point of one of the hottest spots in the United States these days. Yet he and his department, amid the pains of peacetime controls, reconversion and general critical shortages are attempting to carry out their job—a most difficult one.

eration. The quota for any month is arrived at by multiplying the daily average by the number of calendar days in the month.

Even though an operator may own more than one plant, separate quotas will be worked out for each plant, with one exception. Where it is a normal practice for an operator to shift a substantial proportion of production among his plants, the Expediter may order a combined quota to be established.

In the event that a plant's shipments should fall below its quota for any month, the deficit must be made up the following month before premium payments may be claimed, that is, the deficit must be added to the subsequent month's quota. However, this does not apply if the operator can show to the satisfaction of NHA that the slow-down was due to circumstances beyond his control.

An operating plant is generally defined as one which has operated at some time during the base period; a closed plant as one in

which did not operate during the period; and a new plant as one which has come into blast for the first time after Sept. 1, 1946.

Quotas for re-opened or new plants shall be zero but "such premiums shall be payable on no more than 50 pct of merchant pig iron during the month covered by the claim."

Mr. Wyatt expects an immediate increase, rising to a maximum of 75,000 to 100,000 gross tons a month by December as a result of premiums. By that time, he estimates, production of "merchant pig iron" will have reached from 460,000 to 500,000 tons as compared with an estimated 360,000 tons without the plan. NHA's definition of merchant iron includes foundry and malleable grades only.

"By the first quarter of next year," he said, "production should be up at least one-third above what could have been expected without the stimulus of premiums. It is expected that another 35,000 to 80,000 gross tons a month may be produced by re-opening of closed plants.

Some quarters here are less optimistic than NHA as to the effectiveness of the program. They point out that furnaces operate on a continuous basis which allows for little increase or decrease and that ore, coke and scrap shortages may be a definite limiting factor in additional output.

There is some apprehension, too, that some furnaces may turn from

How to Do It

Washington

• • • To apply for single, combined or adjusted quotas, file on form NHA 14-98, which may be obtained from any RFC loan agency.

Bonus payment claims must be filed on form NHA 14-99 before the last day of the month following the month of shipment, except claims for the month of September which can be filed up to Nov. 30.

Plants paying the \$2.00 bonus for accepting transferred basic orders must file their own certification and that of the basic producer plants on form NHA 14-107.

To have a quota deficit set aside, application must be made on form NHA 14-99.

basic and other production under the inducement of incentive payments for foundry and malleable grades. NHA declares, however, that discussions of the plan with industry indicate that little diversion, if any, from steel grade capacity is expected.

Chicago

• • • The premium plan for merchant pig iron, announced Sept. 18 by housing expeditor W. W. Wyatt, is not seen here as a guarantee that more iron will be produced. The ruling which provided \$8.00 per ton for production above base

period quotas by plants already in operation and \$12.00 per ton for production from plants which will be reopened, will have to be carefully figured, particularly on any plants where iron production has been previously stopped.

It has been stated and it is the general belief, that 35,000 to 80,000 tons per month will be produced by the reopening of closed furnaces but that the full effect will not be felt until January of next year. Iron producers in this area point out that it will take at least 2 months to estimate whether or not it would be economical to relight the cold stacks when the premium payment plan is only guaranteed until June 30 of next year. The stacks that have been abandoned need major repairs of one sort or another with complete relining needed in some cases. At the present high price of materials, labor and a shortage of labor, the premium payment plan is not expected to induce as much iron as estimated from furnaces that have been closed.

Aside from the above factors, the iron producers point out that they have no assurance that coke in sufficient quantities will be available to carry on continuous operations. Although the demand for merchant iron is heavy and it is thought will continue, there are so many unpredictable features in relighting cold stacks as to preclude many operators from resuming production.

Non-Certified Industries Face Layoffs Due to Iron Shortages

Pittsburgh

• • • With 50 pct of the national output of foundry and malleable grades of pig iron channeled into housing and agriculture through certifications under direction 13 to order M-21, there is a definite possibility of some wholesale unemployment occurring within the next month or so. Such industries as the automotive, electrical, mining, food processing, and chemical are being driven close to major operational curtailments by the shortage of pig iron, aggravated by a scrap shortage, in their foundries.

The National Housing Director recently stated that only 130,000

gross tons a month of pig iron are going into housing pipe items (soil and pressure pipe and fittings), but the weak point of this statement is that merchant iron capacity is only about 350,000 tons a month and production is somewhat closer to 325,000 tons a month.

Thus, companies in other fields are forced to get their iron from the slim unallocated sources, which are constantly dwindling. Pipe requirements of iron, now 50 pct of iron output, were only about 15 pct in 1941.

By T. E. LLOYD
Pittsburgh Regional Editor

Locally, the Pittsburgh area is harder hit than some of the other areas. There is only one regular supplier of merchant iron in this district, and about 50 pct of its output is going to about 10 pct of its customers. Thus, 90 pct of the company's normal customers are scrounging around for iron since their requirements are not met by their normal supplier. Many users that have heavy allocations in this area are not normally supplied completely from the area, getting some of their iron from the southern furnaces and from the furnaces in the Buffalo and northern areas.

Companies in the Pittsburgh

Machine Tool Distributors Condemn Recent WAA Actions; Ask for Reforms

Hot Springs, Va.

• • • After a serious and lengthy debate, occupying an entire afternoon, the more than 100 members of the American Machine Tool Distributors' Association, meeting at Hot Springs for their 22nd annual meeting, prepared a resolution condemning in no uncertain terms the recent activities of the War Assets Administration. Copies of the resolution have been sent to top officials in WAA, Army, Navy, and other branches of the government, and it is hoped that this public expression of dissatisfaction may have some effect in correcting the many abuses and injustices from which it is asserted, that distributors are now suffering.

In addition to condemning what it termed the inefficiency of WAA, the resolution demanded that adequate reserves of machine tools be set up out of surplus for the Army and Navy for future national defense. It further objected to the failure of WAA to consult with the machine tool industry on matters of policy, and demanded that a real advisory committee be reconstructed and utilized. A warning was also expressed as to the danger of cutting Clayton formula prices, and it was urged that WAA abstain

from further practices which members claim may mortally injure the machine tool industry.

In charging that lamentable conditions exist in WAA offices, speakers asserted that only two areas, the Bronx warehouse and the Buffalo area, stand out as bright spots in an otherwise gloomy picture. Intelligent management was given as the reason for this, and seemed to indicate that agreeable conditions could prevail in other areas if adequately trained personnel were employed, they stated.

The delegates saw a motion picture record of association president A. B. Einig's world tour as a member of Ambassador Pauley's reparations commission. Covering 50,000 miles in 76 days, Mr. Einig obtained photographic evidence of the destruction to enemy property effected by bombing, and the extent to which Russian occupation forces have stripped equipment from manufacturing plants.

New officers of the association are: President, George Habicht, Jr., Marshall & Huschart Machinery Co., Chicago; 1st vice president, D. N. Macconel, Machinery Sales Co., Los Angeles; 2nd vice president, R. L. Giebel, Inc., New York; secretary-treasurer, C. C. Brogan, W. E. Shipley Machinery Co., Philadelphia.

district that either fall completely out of the certification category or which find that a major part of their production cannot be certified, are such firms as United Engineering and Foundry, Vulcan Mold, Mesta, Blaw-Knox, Westinghouse, and Westinghouse Airbrake. These companies all are short of iron and any or all of them may be forced to shut down part of the other operations because of the shortage of foundry products. For example, Westinghouse operations at East Pittsburgh are dependent upon a steady flow of castings from Trafford. There has been no curtailment of operations at Trafford, although a matter of a couple of weeks may mean shutdowns at Trafford, followed immediately by curtailed operations at East Pittsburgh. How severe the curtailments at East Pittsburgh would be depends entirely upon incoming scrap and iron.

The situation is similarly acute in the various other non-housing and non-agricultural producing manufacturing plants that have foundries. Observers here feel that these curtailments will start within the next month or so. When layoffs start, the companies anticipate that the various unions as well as the individual employees will bring pressure to bear to remedy the situation.

OPA Revises Pig Iron Rule

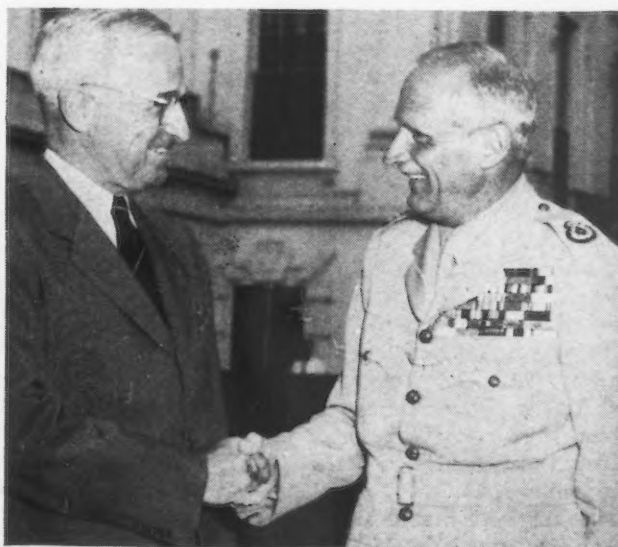
Washington

• • • To make it conform to the NHA bonus plan, OPA has revised its general pig iron regulation. Under the premium plan a merchant operator may pass on to and pay \$2 a ton premium to another producer contracts for making basic iron. This can be done in order that the former may devote capacity production to foundry and malleable grades. The regulation was changed so as to maintain, at least in a legal sense, the existing ceilings for all grades of merchant pig iron. These remain unchanged, OPA said, since the bonus payments will be made before final sale to the consumer, which will take place at ceiling price. The revised regulation was made retroactive to Sept. 1, the effective date of the bonus plan.

o o o

SANS BERET:
President Truman shakes the hand of the man who stopped Rommel during the dark days of the war in Egypt, Field Marshal Viscount Montgomery of Alamein. It is one of the few pictures showing the British marshal without his tankers' beret.

o o o



Tucker Corp. Leases Dodge-Chicago Plant To Produce New Auto

Washington

• • • WAA has announced that terms of the leasing agreement with option to purchase have been consummated with the Tucker Corp., Chicago, for the government-owned Chicago plant leased and operated during the war by the Dodge-Chrysler Corp.

The plant will be used by the Tucker Corp. for the manufacture of a new type automobile to be

For details on Tucker car see THE IRON AGE, July 25, p.p. 106-107.

called the "Tucker Torpedo," WAA said and the employment of approximately 35,000 to 45,000 in the plant is anticipated.

Subject to compliance with the Surplus Property Act of 1944 and contingent upon approval of the Dept. of Justice that the proposed agreement will not violate any of the anti-trust statutes of the United States, WAA will execute a 10-yr lease effective Mar. 1, 1947, with the Tucker Corp., to include all of the real property acquired by RFC in conjunction with the plant, in addition to certain equipment, tools and machinery.

The lease, however, will be contingent upon the Tucker Corp. submitting evidence by that time that it has sufficient working capital and cash reserve to warrant its assuming the obligation of a lease and the operation of the plant.

Soil Pipe Rules Changed

Washington

• • • Provision for temporary deferment in certain cases of housing order 4 reducing the output of large size cast iron soil pipe, has been announced by CPA.

As amended the order reads "cast iron soil pipe and fittings" and defers the Sept. 1, effective date for producers whose applications show that:

(1) More than 7 pct of August production was in sizes of 5-in. or larger, and (2) that a reduction during September to conform to the order will materially affect output as a result of either of the following conditions:

(A) Inability to fully and efficiently use their skilled labor for

production of cast iron soil pipe and fittings, or (B) inability to produce a total tonnage of cast iron soil pipe and fittings substantially equal to the total tonnage produced in August because equipment for small sizes is inadequate or unavailable.

It is pointed out that producers granted a time extension may not produce sizes of 5-in. or larger in greater quantities than they made during August.

Sharon Steel Purchases Bopp Steel of Detroit

Sharon, Pa.

• • • Officials of Sharon Steel Corp. have completed plans for the acquisition of the Bopp Steel Corp., a cold-rolled finishing mill, located at Detroit.

Through this transaction, Sharon acquires a finishing unit which will consume about 60,000 tons of its hot-rolled strip annually and will further strengthen Sharon's position in the Detroit market.

The Bopp Steel Corp. is located near Sharon's wholly owned subsidiary, Detroit Seamless Steel Tubes Co.

HAPPY CHOICE: W. Averell Harriman, who leaves the post of Ambassador to the Court of St. James to become Secretary of Commerce in place of Henry A. Wallace, who talked himself out of the job. Mr. Harriman has held top positions in London and Moscow in addition to his extensive business interests.



Seeks Premium Payment Of \$15 for Wire Nails

Washington

• • • A premium payment plan for wire nails amounting to \$15 a ton is expected to be laid before the CPA Wire Products Industry Advisory Committee this week.

Another project of Wilson W. Wyatt, Housing Expediter, this program would be the fourth housing subsidy involving metal products—the others, already put into effect, cover convactor radiation, cast iron soil pipe and merchant pig iron.

The background on this program runs something like this:

(1) CPA estimates nail production for September at about 66,000 tons which is very close to capacity on a 40-hr week basis.

(2) Mr. Wyatt maintains that at least another 5000 tons of nails must be produced each month.

(3) Admittedly, this would require a return to a 48-hr week making labor cooperation a necessity.

(4) Assuming labor would be willing to go along, considerable overtime would be required. Therefore Mr. Wyatt would be willing to pay a premium of \$15 a ton for over quota nail production.

Actually this would result in raising the ceiling price on all nails, despite OPA's refusal to take such action.

CPA Amends Iron Order

Washington

• • • Because of delay in receipt of applications, CPA has postponed to Sept. 30 from Sept. 27, issuance of October authorizations to purchase pig iron for housing products and railroad brakeshoes. As a result of this postponement, CPA said that pig iron producers in turn will be required to accept such orders for October delivery up to Oct. 5.

Producers of housing products and railroad brakeshoes are permitted, under Direction 13 to the steel preference order M-21, to certify to CPA their pig iron requirements for these products, during the fourth quarter of 1946. Direction 13 has been amended to include the new authorization and delivery dates.

Russia's Nonferrous Metals Come Largely From Caspian Sea Area

• • • Kazakhstan is a republic of the U.S.S.R., northeast of the Caspian Sea, which is reported by Russian sources to produce 40 pct of its copper, 80 pct of its lead and has set up for the production of molybdenum, wolfram, antimony, tin and manganese.

• • •

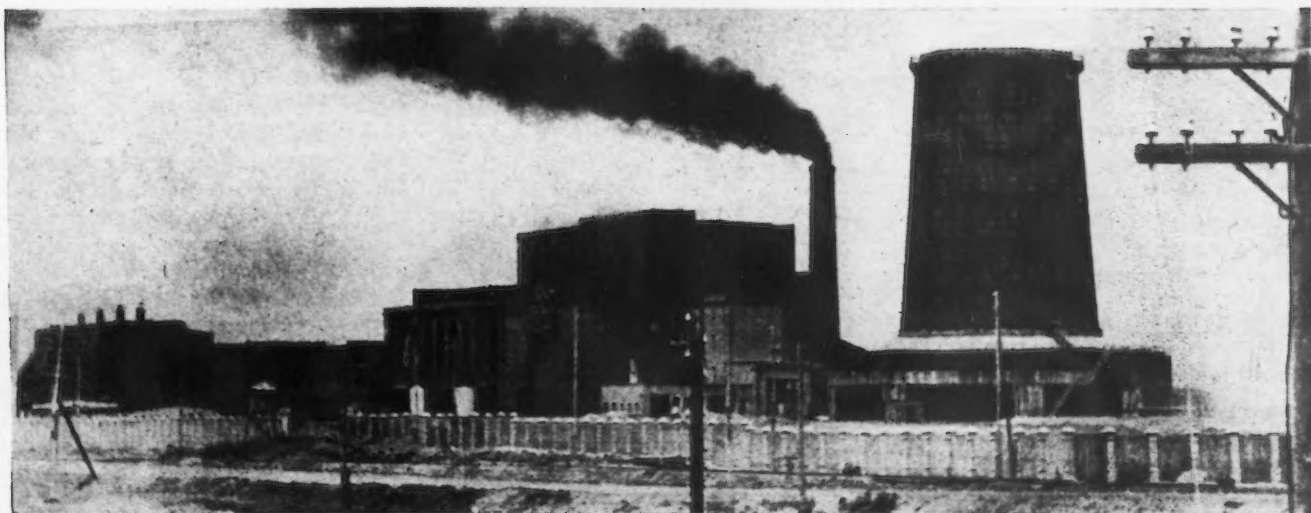
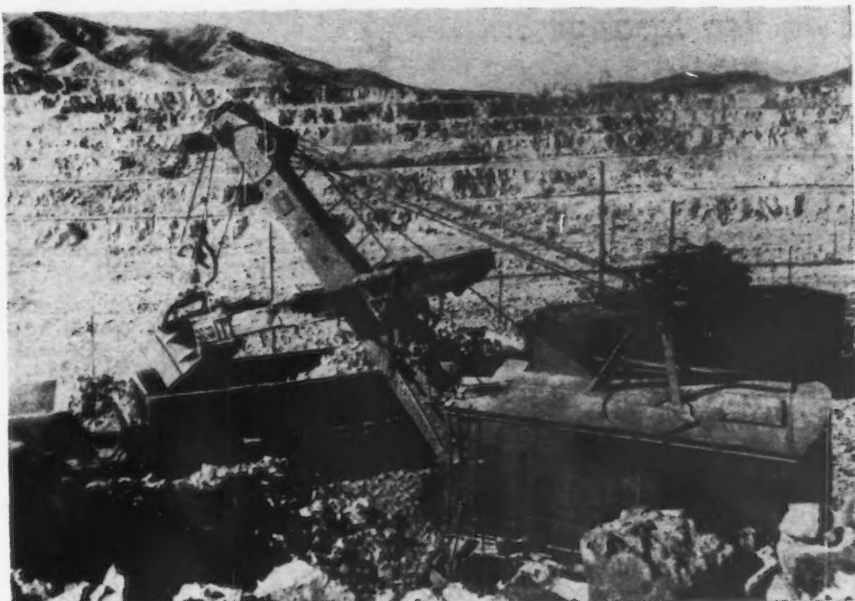
• The Balkhash copper smelting plant and its main ore supply, the Kounrad mines are located in central Kazakhstan. Ore is mined by open cut methods and ore trains leave for the smelter every half hour. (Upper Right.)

• • •

• Construction of the Chimkent lead works began in 1930. Ore comes from the rich deposits in the Kara Tau mountains in Kazakhstan. Chimkent is said to be among the largest producers of lead in the world. This view shows the pouring of lead pig. (Right.)

• • •

• The Aktyubinsk ferroalloy plant went into operation in 1942. This was the first ferroalloy plant to be established in Kazakhstan. (Below.)



Swedish Sponge Iron Powder Now Available at Lower Prices

By JOHN ANTHONY
Eastern Regional Editor



SWEDISH IRON POWDER: The sponge iron plant at Hoeganaes whose present capacity is 8000 tons of iron powder annually.

New York

• • • Swedish sponge iron powder is now available on the United States market at a price that is lower than prewar imports. Ekstrand & Tholand, New York, import agents for the Hoeganaes-Billesholms Co. of Sweden, reveal that there are now two grades of iron powder available and there will soon be another placed on the market, all three of which are said to excel the prewar grade in iron content and lowered impurities.

The prices of the currently available Swedish iron powders are 7.40¢ and 8.00¢ per lb for carload lots packed in ocean paper bags and delivered duty-paid at dockside, New York, as compared with 8.50¢ per lb for the prewar powder. This price reduction represents a considerable production cost achievement in the face of the inflationary trends in Sweden and the United States, particularly considering the improved quality of the powders.

The improved purity of the Swedish iron powder should, according to its makers, permit it to enter markets hitherto closed to it, such as for higher strength parts and alloyed iron parts. It may also be able to enter the electrical field in competition with some higher priced iron powders.

The lower range of impurities, higher iron content, and for some applications the annealing, should

mean to iron powder parts producers generally decreased tool wear and better green and sintered strength of parts. It should bring greater dimensional stability during sintering, and therefore closer tolerances. It should permit the production of more complicated shapes because of better moldability.

The newly established price policy for Swedish iron powder means perhaps more toward an expansion of its market than the quality improvement. Some parts now fabricated by methods other than powder metallurgy, because the cost of metal plus machining costs are low enough not to justify compacting from iron powders, are expected to be converted to this means of production, thus expanding the tonnage of iron powders consumed. Current prices for domestic reduced iron powders range from 11¢ to 16¢ per lb in ton lots.

The present production capacity at Hoeganaes is some 8000 tons annually of sponge iron in powder form, and the management has expressed its willingness to expand facilities to meet possible accelerated demand. The producer has its main facilities geared to a production of 30,000 tons of regular sponge iron for steelmaking purposes, from which as large a pro-

portion as needed can be diverted for the production of powders.

The production of the Swedish iron powders differs basically from the production of domestic iron powders in the availability within the Hoeganaes group of enterprises of a natural, highly controlled raw material. The method of reduction is said to be quite unique and is not followed elsewhere.

Ekstrand & Tholand will market Swedish iron powder direct to the consumer, and operate a New York laboratory for control and advice in the field of ferrous and nonferrous powder metallurgy.

The powder iron development was started by Hoeganaes about 1932 in response to the demands of the United States industry and large scale shipment here began about 1936. Production of sponge iron by Hoeganaes began about 1911 in a move to develop their basic raw materials of ore, coal and clay. Today Hoeganaes-Billesholms Co. is the dominating factor in the ceramic and allied industries in Sweden. As early as the sixteenth century the mining of coal at Hoeganaes had begun on a small scale, around which the only coal deposits in Sweden are located. Nowadays, the company sells less and less coal but uses it for its furnaces, gas works and power plants to produce fireproof bricks, chemical stoneware, grinding wheels, coal derivatives, glass wool and fiber, and other products. The present organization began operations in 1738.

During the war powder production was continued and research and development work increased. However, exports to the United States had to be discontinued.

Swedish Iron Powders

	A-M	AA-MH	MHK	Prewar Iron Powder
Fe	97.5+	98+	98.5+	96.5 to 97.0
SiO ₂	0.20 max.	0.20 max.	0.05 approx.	0.50 max.
Loss in H ₂	1.40 max.	0.70 max.	0.70 max.	1.50 to 1.75%
C	0.20 approx.	0.20 approx.	0.10 approx.	0.35% approx.
Annealed	No	Yes	Yes	No
Price, per lb	7.40¢	8.00¢		8.50¢

Weekly Gallup Polls . . .

Overwhelming Majority Approves European Occupation

Princeton, N. J.

• • • Secretary of State Byrnes' warning at Stuttgart that the United States is not going to pull out of Germany or Europe has solid support from American public opinion, according to George Gallup, director, American Institute of Public Opinion.

A coast to coast poll by the institute completed shortly before Mr. Byrnes made his speech shows that eight in every ten voters think it is best to keep our troops in Germany and elsewhere in Europe.

Persons who have a member of their immediate family in the armed forces at the present time express the same opinion by virtually the same majority.

Observers versed in foreign affairs will likely find the poll result significant in the light of predictions that have often been made as to how the public would react to continued chaos and trouble in Europe.

Some people have said that Americans would become so disgusted with the turmoil there and the apparent futility of trying to make satisfactory treaties that they would want to pull out.

This poll indicates that such a reaction is certainly far from present now.

The country's vote in the poll is as follows:

"Do you think we are doing the best thing to keep troops in Germany and other defeated nations in Europe, or would it be better to bring all our troops home now?"

The results:

	Pct
Keep troops in Europe	80
Bring troops home	16
No opinion	4

The same question was asked concerning Japan, as follows:

"Do you think we are doing the best thing to keep troops in Japan, or would it be better to bring all our troops home now?"

	Pct
Keep troops in Japan	81
Bring troops home	15
No opinion	4

Majorities as large as 80 and 81 pct are not often found in public opinion polls on national or world issues.

If there is a demand to bring the boys home from Europe it would presumably start with the families who have a member in the armed forces now.

Yet in this poll the vote of such families is no different from the rest of the country. In the case of Germany and Europe it is 81 pct for leaving our troops there, and in the case of Japan, 82 pct.

Veterans of World War II are more in favor of maintaining occupation troops than the rest of the public. The vote of veterans questioned in the poll was 93 pct in favor of keeping troops in Germany and Europe, 94 pct in favor of keeping them in Japan.

The poll likewise finds no evidence of any return to isolationist thinking on the part of voters of the Middle West. So far as the question of clearing out of Germany and Japan is concerned, the majority vote in that area is virtually the same as elsewhere.

The vote of the Middle West (Ohio, Indiana, Illinois, Michigan, Minnesota, Wisconsin, Kansas, Nebraska, Iowa, North Dakota, South Dakota, and Missouri):

	Germany Pct	Japan Pct
Keep troops there	78	81
Bring them home	17	15
No opinion	5	4

• • • A large majority of the American people express satisfaction with the work which James F. Byrnes has been doing as Secretary of State.

Nearly six out of ten of his fellow countrymen polled by the institute say Mr. Byrnes has handled himself in a highly laudable fashion since he took office a little more than a year ago (July 3, 1945). One in ten considers that he has done a poor job in his dealings with foreign nations during the difficult period since the ending of the war.

Mr. Byrnes gets a high vote of confidence from Republicans as well as from Democrats in the poll.

The country's attitude toward its Secretary of State was mea-

Poll Finds American Public Fully Satisfied With Byrnes' Work as Secretary of State

• • •

sured by the institute through a cross-section poll on the following question.

"James F. Byrnes has been Secretary of State a little over a year. In dealing with foreign nations would you say he has been doing an excellent, good, fair or poor job?"

The vote:

	Pct
Excellent	16
Good	41
Fair	17
Poor	10
No opinion	16

Those who said "poor" offered only one big criticism, to the effect that Mr. Byrnes has been too easy-going in dealing with other powers, that he allows other countries to "dictate" too much, and that he should be more "aggressive."

It is often said that politics in the United States stops at the water's edge.

Attitudes toward Mr. Byrnes are remarkably free from partisan coloration. There is some difference of opinion between Democrats and Republicans, as might be expected. But the difference is so small that it would be difficult to see how Mr. Byrnes' handling of foreign affairs could become much of an issue in the approaching Congressional election campaign.

The vote of Democrats and Republicans in the poll follows:

	Democrats Pct	Republicans Pct
Excellent or good	61	54
Fair	15	20
Poor	8	11
No opinion	16	15

• • • If Russia has a good case for its foreign policy, as some people firmly believe it has, the Soviet has not succeeded in convincing a substantial part of the

(CONTINUED ON PAGE 170)

OPA Suspends Price Control On Special Industrial Equipment, Parts

Washington

••• Suspension of price control over additional specified types of industrial equipment and machinery and parts, including electrical, construction, food processing and poultry farm machinery and equipment, has been announced by OPA. The action became effective Sept. 18.

Approximately 40 pct of industrial machinery and equipment is now freed from pricing restrictions, OPA officials estimated. This, the third such broad order, affects about a half-billion dollars worth of annual production and brings the total now decontrolled to around \$6 billion, annually, they added.

Some electrical equipment parts have been kept under price control although the price restrictions have been removed from the complete items; this was done, OPA explained, because such components are also used for purposes other than manufacture of the complete item.

Electrical equipment suspended by the action, sales of parts of which remain under control, follow: Electrostatic charge eliminators, electronic heat generators, electronic precipitators, high voltage testers or test equipment, impulse testing equipment including surge generators and cathode ray

oscillograph, oscillographs and radar assemblies.

Other electrical equipment covered by the suspension action consists of cottrell transformers specially designed for precipitation service; motion picture lights, Klieg light type including arc and incandescent lamps and lighting equipment designed solely for use in commercial motion picture production and projection and in commercial still picture production; photoelectric cells except those used in exposure meters for photography; terminal and stuffing tubes, marine type; electrical coils, and fabricated coil rewinding supplies for meters, generators, transformers and related items decontrolled in the past or by today's action.

Construction machinery and equipment covered by the action is largely confined to highway building and maintenance and to a small extent to large building projects. These items are: Aerial tramways; highway barricades; tank car boosters; road, construction and rotary brooms; concrete chutes; asphalt plant circulators; concrete aggregate dryers; aggregate feeders; flares for highway use not including truck flares and pyrotechnic flares; street flushers; road and sidewalk forms; stone, sand bitumen heaters; heaters for concrete mixers, asphalt, surface

and tank car; mud jacks; heating, bituminous kettles; mortar boxes; plants, asphalt, bulk cement, soil stabilizers but not including portable concrete plants; floating pontoons; scaffolds and construction towers; stump pullers; street sweepers and wellpoint systems.

Also suspended is machinery and equipment under RMPR 136 which is designed and sold primarily for industrial processing or preparing such foods as baking powder, chocolate, coffee, confectionery products, salt, sugar, etc., and including such processes as working, shelling, roasting, grinding, mixing, etc.

Poultry farm equipment exempted by the action includes all such items not previously decontrolled such as candler, graders, incubators, brooders, feeders, etc.

Miscellaneous machinery suspended by this latest action includes that used in the textile industry to convert flax plants to flax fiber, including breakers and scutchers; animal power-operated clipping and shearing machinery; belt lacing, fasteners, staples and other belting accessories; power-operated lumber carriers; charging equipment for coal and gas plants; grease cups, oil cups, diaphragms and industrial clutch facings, when covered by the machinery regulation (RMPR 136); gas benches and retorts for gas plants; power-operated garbage grinders except those for domestic purposes; heat exchanger equipment of the shell and tube type with a heat transfer area over 50 sq ft; industrial brake linings and mufflers and silencers, subject to RMPR 136; machine parts in which perforated metal accounts for 90 pct or more of the weight of the part; hand operated pumps including accessories which are integral and functional parts; industrial spark plugs; industrial and marine superheaters; brake testers, automotive maintenance and servicing; towers, bubble and fractionating; metal cooling towers; power operated automobile washers.

The miscellaneous machines being suspended are held by OPA to be in good supply because of substantial production during the war and because of the amount held by the government which is available as surplus.

LOOKING SHARP: More than \$10,000 annually is salvaged in this operation in which tar paper floor covering is burned in an incinerator to recover gold scrap at the Eversharp Chicago plant.



Lead Shortage Is Attributed To British-U. S. Importation Agreement

Detroit

• • • Government price controls, depletion of ore reserves, partial or complete destruction of certain mining properties, limitations on lead imports, labor disturbances and continued labor shortages have all been blamed for the dwindling supply of lead which is currently threatening to make it necessary in a matter of weeks to deliver automobiles without storage batteries to thousands of car-hungry buyers.

Whatever the cause of the lead shortage, the jobs of more than 500,000 persons engaged in the automobile industry are reported to hang in the balance while government officials, automobile producers and mine operators search for a solution to the lead problem which today poses the most serious single threat to automotive supply lines.

In a recent letter to John R. Steelman, director of the Office of War Mobilization and Reconversion, George W. Mason, president of the Automobile Mfg. Assn. has charged that the lead shortage stems from the way in which government agencies controlling lead are keeping off the market a supply of the metal which is potentially adequate for essential uses.

According to Mason, total U. S. lead consumption is approximately 80,000 tons per month. Domestic production from mines, he says, has averaged 25,000 to 30,000 tons per month, while operating under a labor shortage of 25 pct and "a subsidy program which appears to be so contrived as to put a premium on the working of high-cost, low-yield mines and a penalty on the working of high-yield veins."

"Whereas the scrap market should be yielding another 25,000 tons a month," according to AMA the actual flow now appears to be a fraction of that amount. We are told that this is a direct result of reestablishing for the domestic market a price of 8.25¢ a lb at a time when the effective world market is known to be 10¢ or more and the U. S. Office of Metals Reserve is buying abroad at more than the domestic price."

Government purchases of metals abroad, it is asserted, are based upon informal agreements and understandings with foreign nations made without consultation or explanation to the American public or lead-consuming industries.

In addressing the American Mining Congress at Denver early this month, Andrew Fletcher, executive vice-president of St. Joseph Lead Co., largest producer of primary lead in the U. S. disclosed that last April he had learned that the U. S. government had made an agreement with England to import only 137,000 tons of lead in 1946 whereas 350,000 tons were imported in 1945. Actually, he said, imports to date have averaged only 8000 tons per month which is at a rate of 100,000 tons per yr.

Fletcher has estimated that domestic requirements for lead are about 1 million tons per yr of which 400,000 tons must come from mines, 300,000 tons from scrap and the remaining 300,000 tons must be imported to meet requirements.

In his address Fletcher renewed a former plea for decontrol of lead and in the interim the raising of ceiling prices of 8.25¢ a lb in New York to an equivalent of the foreign market price of 10.5¢ f.a.s. Gulf ports.

John R. Steelman, reconversion director, however, has said the acute lead shortage would not be relieved substantially by a ceiling increase. In a letter to AMA, Steelman attributed the lead scarcity to "depletion of ore reserves and absence of new discoveries," partial or complete destruction of certain mining properties, and labor problems.

Steelman offered no comment on the possibility of easing existing restrictions on imports although C. E. Wilson at a recent press conference revealed that General Motors was attempting to obtain permission from the government to import lead. Steelman said he had directed the CPA to work with primary lead producers on an exploration and development project to increase known sources of lead.

It has been estimated that approximately 35 lb of lead is required to build a new passenger car.

MEDALISTS: Secretary of War Robert Patterson is shown with members of the War Production Board to whom he presented Medals for Merit in a ceremony at a Washington Hotel, Sept. 19. Seated (left to right): James S. Knowlson, Stewart-Warner Corp., Chicago; Edward R. Stettinius, Jr., Rapidan, Va.; John Lord O'Brien, Washington; Secretary of War Patterson; Sidney Weinberg, New York; Hiland G. Batcheller, Allegheny-Ludlum Steel Corp., Breckenridge, Pa. Standing (left to right): Theodore Paul Wright, CAA, Washington; John David Biggers, Libby-Owens-Ford Glass Co., Toledo; James S. Adams, Standard Brands Corp., New York; William E. Levis, Owens-Illinois Glass Co., Toledo; Charles E. Wilson, General Electric Co., New York; Joseph D. Keenan, Chicago Federation of Labor, Chicago; Harold Boeschstein, Owens-Corning Fiberglass Corp., Toledo. The awards were made in recognition of outstanding services in the war effort. Other recipients of the medal who are not shown here include Donald M. Nelson, former WPB Chairman, William L. Batt, SKF Industries, Philadelphia, and L. R. Boulware, General Electric Co., New York.



Electric Furnace Men Protest OPA Ban On Billet Crop Premium

Pittsburgh

• • • In protest to the OPA's ruling that billet, bloom and forge crops would no longer exist as scrap classification 13, consumers in this area protested on Sept. 19 to OPA Administrator Paul A. Porter, seeking the re-establishment of the grade. In a letter signed by a majority of the electric furnace and acid openhearth producers in this area the re-establishment of the classification with the same \$5.00 a ton price differential

that has heretofore been in effect was urged.

The letter pointed out that the Pittsburgh area generates and uses the largest tonnage of this grade in the country. Consequently, electric furnace and acid openhearth producers in the area have developed processes and product dependent upon a free flow of the classification.

Under the recently amended ruling, producers of billet, bloom and forge crops have stopped shipment and cancelled existing orders. Rather than ship these items as classification 14, low phos with its \$2.50 premium instead of \$5.00 a ton premium, the producers are

withholding the material for their own consumption, maintaining the differential does not warrant marketing in the present tight market.

The amendment that killed the classification, Amendment No. 8, has brought an insurmountable crisis among the electric furnace and acid openhearth producers here, the letter pointed out, and immediate action to reinstate in this area the billet, bloom and forge crop category was urgently recommended.

Canadian Strike Will Intensify Nail Famine

Ottawa

• • • Production of nails will end in Canada this month unless there is immediate settlement of the steel strike, officials of the Dept. of Reconstruction stated. Supply of nails has been acute for some time and dealers are allocating their meager stocks among builders. The small flow of nails still coming from producers is being directed by the Reconstruction Dept. to food packing agencies and to government-owned housing projects.

It is reported here that the Ottawa situation has become so acute that one builder went to Massena, N. Y., and bought two kegs of nails. Taking into consideration the higher American price, cost of the trip and duty the estimated cost of the nails was \$16 per keg, compared with the normal price of \$5 to \$6.

A Toronto interest is reported to have acquired a carload of nails from the United States 2 or 3 weeks ago and after duty and freight, was offering them at approximately \$13 per keg.

Calls Tin Conference

New York

• • • The United Kingdom has invited the main tin-consuming and tin-producing countries to an International Tin Conference in London. In addition to the United States which has accepted, the countries invited are Belgium, Bolivia, China, France, the Netherlands, Siam and Russia.

The object of the conference is to consider the prospective world tin position and whether continuous inter-governmental study of that position is necessary. It is hoped that the conference will open about Oct. 8.

Coming Events

- Sept. 30-Oct. 3 American Society of Mechanical Engineers, Boston.
- Oct. 1-4 Assn. of Iron & Steel Engineers, Iron & Steel Exposition, Cleveland Public Auditorium, Cleveland.
- Oct. 3-4 Magnesium Assn. of America, New York.
- Oct. 3-5 National Electronic Conference, Chicago.
- Oct. 3-5 Society of Automotive Engineers, aeronautic meeting and display, Los Angeles.
- Oct. 9-11 Porcelain Enamel Institute, University of Illinois.
- Oct. 10-12 American Society of Tool Engineers, semi-annual convention, Pittsburgh.
- Oct. 16-19 Electrochemical Society, fall congress, Toronto.
- Oct. 23-26 National Tool & Die Manufacturers Assn., convention, Chicago.
- Oct. 28 American Institute of Steel Construction, annual convention, Coronado, Calif.
- Oct. 28-30 American Gear Manufacturers Assn., semi-annual meeting, Chicago.
- Oct. 29-Nov. 1 Refrigerator Equipment Manufacturers Assn., exposition, Cleveland.
- Nov. 7-8 National Founders Assn., New York.
- Nov. 15-24 National Aircraft Show, first annual exposition, Cleveland.
- Nov. 17-22 American Welding Society, annual meeting, Atlantic City, N. J.
- Nov. 18-22 National Metal Congress and Exposition, Atlantic City, N. J.
- Dec. 2-4 Society of Automotive Engineers, air transport meeting, Chicago.
- Dec. 2-7 National Power Show, New York.
- Dec. 5-7 Electronic Microscope Society of America and American Society for X-ray and Electron Diffraction, joint meeting, Pittsburgh.
- Dec. 5-7 Electric Furnace Steel Committee of Iron and Steel Div., American Institute of Mining and Metallurgical Engineers, annual conference, Pittsburgh.

The Army in Council

THE army chiefs have now returned to their various commands and responsibilities after their conference at Camberley, under the chairmanship of Field Marshal Viscount Montgomery. Their recommendations go forward from the conference to the Army Council and may be expected to cover the strategic commitments that arise from the present state of the world, the tactical dispositions and arrangements required to meet them, and the plans, training and equipment necessary to create anew an army competent to carry the fresh burdens thrown upon it, and to profit by the lessons learned during the war. Part, at least, of the conference must have been enjoyable. Nothing is more pleasant than an inquest after an overwhelming victory, and, after all, there are rarely part scores in modern war. It is always grand slam, bid, doubled and redoubled. "If only" and "As I said at the time" lose some of their bitterness when the final battle has been successful. But the future presents a different picture.

As Lord Montgomery himself has said, the army is simply an extension of the nation's power; one of the implements by which it translates its intentions into fact. The strategic implications, then, of the present situation are no more than foreign policy written in military language. But when it comes to tactics the army has some very hard thinking ahead of it. The first item of the agenda must have been the atomic bomb, for the generals would hardly have been human, or sensible, if they did not spend some time in speculating on its effects. As a purely military weapon the atomic bomb is not so revolutionary as it is in other fields. An atomic artillery shell would be a much more dangerous implement on the battlefield itself, for military formations rarely present a worthwhile target for an atomic bomb of the type used in the last war (although that obviously cannot be regarded as necessarily the same as the 1946 version). But move from the battlefield itself and the conse-

quences of the atomic bomb assume larger and larger dimensions. A war fought without recourse to large towns or ports, in which a convoyed fleet is more vulnerable than a dispersed one, despite the submarine, in which any permanent installation can be destroyed from a thousand miles away—these considerations must revolutionize the conduct of battles, even if they do not directly affect the battlefield.

But once again these considerations are not primarily for the army. They are part of defense as a whole and it is for the Cabinet, guided by its scientific experts, to decide them. It would be pleasant to be sure that they were being thought out and decided. But many of the decisions are highly political and can only be taken by Ministers, and it is difficult to believe that the Prime Minister can find very much time to act as Minister of Defense. It will be a very good thing if the impending Cabinet changes include the appointment of a full-time Minister of Defense.

THE army must naturally await these decisions. Only when it knows the conditions within which it must operate, can it work out how to make the most effective use of the resources allowed to it. To the general public the most interesting problem facing the army at the moment is the question of its general organization and training, and there the governing factor is the fact that for the first time in its history the country has in peace a conscript force. Before the first world war Britain needed, and possessed, a small professional army. In that war, with difficulty, it created a large conscript army, a piecemeal affair made up from those professional soldiers who survived 1914 and 1915, those volunteers, Territorials and New Army, who survived 1916, and the conscripts, who came later.

Between the two wars Britain was undecided what kind of army it needed. For some purposes the small professional army was essential. After 1932 what was required was a professional cadre into which

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o o o

the fighting manpower of the nation could be fitted. That cadre Britain never had, not even as late as 1939; in fact, the disaster of Dunkirk was the best opportunity presented, and one very properly taken, of creating the new army it needed. Now the position is different once more. The demand of the thirties, both for a professional army and a cadre for expansion, still exist, but this time there is the yearly intake to provide the opportunity of keeping in working order the machinery by which the small nucleus can rapidly expand itself, in time of emergency, into the nation in arms that a country at war must become. But today, considerations of manpower are more pressing than ever they have been before. Out of the total of some 750,000 men that will probably be all that is available for the armed forces as a whole, it seems unlikely that the army can count on more than 450,000 men.

The immediate task of the Army Council must then be to devise a scheme that fits means to ends. First the country must be given a fully equipped force that, like the RAF of 1940, is just strong enough to beat off any sudden attack on these islands (but, it is to be hoped, with a little greater margin of reserve). Secondly, Britain needs, co-extensive with the first, a plan—and the men and equipment trained to operate it—by which two or three million men and women can be converted into efficient soldiers as soon as may be, if and when the emergency arises. That must be the prime purpose of the professional army. The men they must attract and retain from

(CONTINUED ON PAGE 170)

Westinghouse Announces New All-Steel Electric Motor with New Design

Pittsburgh

••• Completely new in design and construction, a full line of all-steel electric motors was announced recently by Westinghouse Electric Corp. Three outstanding features of these motors are the all-steel construction, the interchangeability of the various component parts, and the fact that it is being built from scratch in a new mass production plant at Buffalo from entirely new designs, with all new equipment, and by an entirely new working force.

Known as the Life-Line, these motors average more than 35 pct smaller in size than their cast-iron predecessors without, however, any sacrifice in electrical properties. Standard NEMA dimensions have been maintained to make the new line completely interchangeable with the old. Pre-greased ball bearings are employed throughout, and require no

attention for a minimum of 5 yr.

From a production standpoint, the degree of interchangeability which has been attained will do much to avoid delays, it is said, and will make possible faster deliveries. For example, to convert a standard open-protected motor into a splash proof, it is necessary merely to turn the end brackets so that their openings face upwards, and to place hoods over the ends. To construct a totally-enclosed fan-cooled unit, the standard frame and rotor are retained, but a special blower replaces the regular fan. Different brackets and hoods are then used to complete the assembly. The rotor brackets, and hoods are interchangeable end for end, and the snugly housed conduit box may be reversed by reversal of the frame.

All steel parts are of heavy section, approximately equal to the thickness of the original castings, with the result that the entire motor is more resistant to shock and mechanical injury. The material is no less resistant to corro-

sion than cast iron, but is protected by highly resistant baked varnish and lacquer. For extremely severe applications, stainless steel shields and hoods are available.

Other improvements include dynamically balanced parts, and careful selection of slot combinations and winding distribution to eliminate vibration. Coil shapes and sizes have been redesigned for easier winding and to reduce the chance of damage in assembly.

Westinghouse will make these motors at a former Curtis Wright plant in Buffalo.

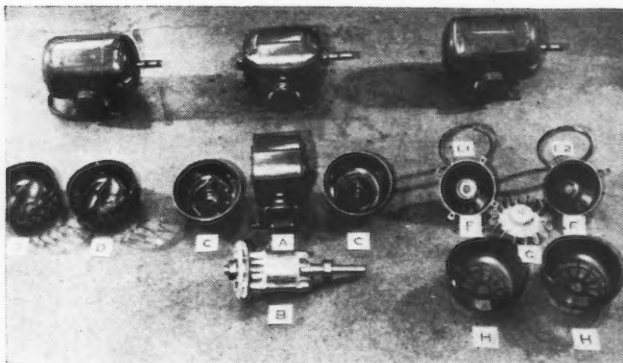
GE Contracts For One Third of Its Tungsten

New York

••• The General Electric Co. has contracted to purchase all the tungsten produced by the Tungsten Mining Corp. during the next ten years. This corporation was established in mid-1945 to operate the Haile mining property in Vance County, N. C. and the GE tungsten properties in Lemhi County, Idaho and Pima County, Ariz.

The Haile property, known as the Hamme Tungsten Mine, is reported to be the largest commercial grade tungsten property in the country with ore ranging from 0.85 pct to 1.00 pct WO₃. It is expected that when adequate labor and equipment become available, ore production and treatment at the rate of 200 tons a day may be reached. The property went into production in January 1944 at the rate of 50 tons per day and is now producing about 150 tons per day. It is set in the middle of the tobacco country and there is little mining labor in the vicinity. Additional housing for the miners is now reaching completion and is expected to assure a more permanent labor supply.

The properties in Idaho and Arizona are not being operated by the company and it is said that the Hamme mine production can provide only a third of the tungsten required by GE. The Idaho mine would require either a 1500 ft shaft or a 1400 ft drift and has therefore been leased to the Bradley interests that operate the adjoining Ima mine. The latter contains large reserves of relatively low grade ore—approximately 0.50 pct WO₃. The Arizona property is not in production.



VERSATILE: Interchangeability of parts which permits quick and simple conversion of a standard open bell motor to splash proof or totally enclosed fan-cooled type by slight modification is illustrated in the photograph to the right which shows the parts which are necessary to convert from one type to another. New motors on the production line are shown below (note: it still takes a year to get delivery).



Mexican Steel Plant To Expand Ingot And Rolling Capacity

By T. E. LLOYD
Pittsburgh Regional Editor

Pittsburgh

••• Mexico is making another bid for industrial independence and especially independence in so far as steel is concerned through the expansion of La Consolidada S. A. La Consolidada S. A. is in the process of building additional steelmaking and steel finishing facilities at two points, and coupling them with the already existing general manufacturing plant at Mexico City. The facilities will be built at a new plant under construction at Lecheria, near Mexico City, and at the plant at Piedras Negras, on the Mexican-Texan border, just opposite Eagle Pass.

At the Mexico City plant there exists a cable plant. Copper wire bars are purchased and rolled and drawn to special section and wire gages, then made into all kinds of cable with rubber, plastic, and muslin coatings. There is also a steel foundry, supplied by a 5-ton Heroult and a 3-ton Pittsburgh electric furnace, and a bronze and babbitt foundry. An 18-in. one-stand breakdown mill now is used in breaking down ingots to billets, and a Belgian type mill consisting of a 2-stand 16-in. rougher and a 6-stand 14-in. and a 2-stand 10-in. mill finishers continue the breakdown to bar and rod sizes. A steel wire mill, a spring plant and a nut and bolt factory complete this plant. These facilities will be left intact and incorporated into the more completely integrated organization.

The main construction project, which will be completed some time in 1947, is at Lecheria. A 12-ton basic electric furnace will be the only steel-making capacity at this plant. Most of the ingots for Lecheria will be supplied from Piedras Negras, some 850 miles to

the north. Lecheria is mainly designed as a finishing operation and is being built from the ground up. Five double door-type ingot heating furnaces with floor type charging and drawing machinery, will heat the ingots to rolling temperatures. Their processing will begin on a 30-in. 3-high, single-stand breakdown mill and proceed to a 24-in. 3-high, single-stand billet mill. These mills are reconditioned used mills. Traveling tilting tables will handle the material through the 24-in. mill. Provisions are being made for the future incorporation of a 3-stand structural and heavy bar mill. This equipment, now on hand, will probably be incorporated into the operation not long after the rest of the mill is ready.

From the billet mill, steel will proceed either to the structural and bar stands or through a continuous heating furnace for further reduction on a 16-in., 14-in., 10-in., mill. This mill consists of a 2-stand, 3-high, and a single stand, 3-high, 16-in. breakdown mill purchased from Hyde Park Foundry and Machine Co., Hyde Park, Pa.; a 6-stand, 3-high, 14-in. mill built by Lewis Foundry and Machine Co., Pittsburgh; and a 6-stand, 2-high continuous, individually driven type rod and bar mill. This bar and rod mill is believed to be the first continuous, individually driven mill of this type to be built, and one of its features is its tandem arrangement, permitting the use of any number or combination of stands



HASTA MANANA:

Steelworks are the same the world over in appearance and so are the workers. Here are workmen going home from the mill of La Consolidada in the Mexico City area.

in the unit. In addition, the plant will have four coilers and a 200 ft. runout table for bar and rod coiling.

At Piedras Negras there already exists a 35 metric ton basic openhearth furnace and a new 60 metric ton openhearth will be installed with ladle crane and equipment. Both of these furnaces are of Arthur L. Stevens design. This plant will provide the ingots for the Lecheria plant, shipping them by rail to the new plant site. The entire operation will be a combination of purchased scrap and iron charge, the iron to be purchased in Texas or Mexico. Scrap is available in abundance in that area on both sides of the international boundary. Power used will be purchased and is 50 cycle power.

It is estimated that the company will have a steel ingot capacity of about 104,000 metric tons (116,500 net tons) a year, exclusive of the steel made for the steel foundry. The 35-ton openhearth and the 60-ton openhearth still to be built at Piedras Negras will account for between 75,000 and 80,000 metric tons (84,000 and 89,000 net tons) of the capacity, while the 5-ton electric at Mexico City, and the 12-ton electric to be built at Lecheria will account for

(CONTINUED ON PAGE 122)

Industrial Briefs...

• **TAKES OVER** — The International Harvester Co. will take over exclusive selling rights of the "Whirwind" terracer previously manufactured by Servis Equipment Co., Dallas. The arrangement will be effective Nov. 1 and the terracer will continue to be manufactured by Servis with the total output being distributed through International Harvester's independent dealer organization throughout the country.

• **FERRACUTE MACHINE CO.**, Bridgeton, N. J., manufacturers of power presses, super speed presses and special sheet metal machinery, announces the appointment of the Bert Carpenter Co., Birmingham, Mich., as exclusive representative for eastern Michigan and northern Ohio.

• **NEW BROACH FIRM** — Acme Broach Corp., Lexington, Ky., a new company, has started production of broaching machines and tools. Francis J. Lapointe, associated with the broaching field for many years, is executive vice-president. I. K. McAdam heads up the design dept and Mr. Ferri and Mr. Vreeland will supervise the broach dept.

• **MERGER**—Cleveland Automatic Machine Co. and LeBlond Engineering Co. are to be merged under the name of the Cleveland Automatic Machine Co., although LeBlond Engineering Co. will be located in Cincinnati, according to a letter sent to stockholders of Cleveland Automatic Machine Co.

• **OPENS NEW OFFICE** — The Landis Tool Co., Waynesboro, Pa., announces the opening of a new Cleveland Office. The address is 3091 Mayfield Road, Cleveland.

• **ACQUISITION** — The Permutit Co., manufacturers of water conditioning equipment, has acquired the Simplex Valve & Meter Co. of Philadelphia.

• **SNAP-ON EXPANDS**—Snap-On Tools Corp., Kenosha, Wis., has opened a fourth factory at Long Branch, Ont., which formerly housed the Canadian Small Arms, Ltd., leased from the Canadian Government. Besides the Kenosha main plant, the firm operates factories at Mt. Carmel, Ill., and Newport, Pa.

• **NEW PLANT**—The American Brake Shoe Co. announces that construction has been started on a new plant in Niles, Ohio, for the manufacture of railroad journal bearings. When completed, the new plant will be operated by the National Bearing Div. It will consist of a foundry and machine shop building. The total area of the plant will be 35,000 sq. ft.

• **WAA PURCHASE**—The Babcock & Wilcox Tube Co. has purchased the welded boiler tubing plant at Alliance, Ohio, from the War Assets Administration for \$1,315,794.

• **CHANGE OF ADDRESS**—Capitol Steel Corp., New York, removed its executive offices to 15 Park Row, New York.

• **MODERNIZED FOUNDRY** — The Eastern Casting Corp., formerly located in New York, announces completion of expanded facilities in its new aluminum permanent mold division at Newburgh, N.Y. The plant has 85,000 sq ft of space, and an expenditure of over \$250,000 has given the company a total capacity of 25,000 lb. of finished permanent mold castings per day, with facilities for operating 35 molds at a given time.

• **NEW FIRM FORMED**—The formation of the Taco West Corp., Chicago, has been announced. The new company will manufacture and market automatic electronic control devices in the fields of combustion control, gas analysis, pyrometry, process control and allied apparatus.

Mexican Steel Plant To Expand Ingot Output

(CONTINUED FROM PAGE 121)

the remainder. On the new plant at Lecheria, the foundations are under construction and the structural buildings are at the plant site. Also a large part of the mills and tables are on the plant site. Some equipment has not yet been purchased but plans are completed for their purchase and it is only a matter of routine.

There are currently no plans for any wide flat-rolled capacity in the setup, and, as pointed out, the structural and heavy bar capacity is only a future provision. The largest section on the present plant layout that can be rolled will be about a 4-in. I-beam section, but should the structural mill be installed, and it is believed that it will, 10 or 12 in. sections can be handled.

FWD Reports Sales For Year Reached New High

Clintonville, Wis.

• • • A profit of \$385,943.61 was reported by The Four Wheel Drive Auto Co. for the fiscal year which ended June 30, 1946. Commercial sales for the year reached a new peacetime high. Total sales, including government business, amounted to \$18,628,835.17.

The report included the financial statements of FWD at Clintonville, the home factory, FWD at Kitchener, Ontario, and the Eagle Mfg. Co. at Appleton, Wis.

According to Mr. Olen, president, the factory operated continuously throughout the year in spite of shortage of material and shutdown or curtailment by strikes in plants of suppliers. The material shortage resulted in increased costs and necessitated carrying partly completed trucks in inventory while waiting for equipment required before delivery could be made.

Unfilled orders on June 30, the report stated, amounted to more than \$9 million.

Profits of the company for the fiscal year totaled 2.07 pct. Profits for the past 4 yr averaged only slightly over 2 pct of total sales.

Construction Steel . . .

New York

• • • Fabricated steel awards this week included the following:

- 1500 Tons, El Centro, Calif., U. S. Gypsum Co., new board plant, to American Bridge Co., Pittsburgh.
- 1200 Tons, East Chicago, Ind., refining building, Sinclair Refining Co., to Bethlehem Steel Co., Bethlehem, Pa. (This job was formerly listed as 400 tons at Harvey, Ill.).
- 670 Tons, Dublin, Ga., woolen mill for C. M. Guest & Sons, to Bethlehem Steel Co., Bethlehem, Pa.
- 325 Tons, Orange, Tex., building for du Pont Co., to Virginia Bridge Co., Roanoke, Va.
- 315 Tons, St. Louis, scales, Howe Scale Co., to American Bridge Co., Pittsburgh.
- 300 Tons, Chicago aircraft hangar to American Bridge Co., Pittsburgh.
- 300 Tons, Chicago Heights, Ill., storage building for American Locomotive Co., to Joseph T. Ryerson & Son, Chicago.
- 245 Tons, Grand Coulee, Wash., coaster gates for Grand Coulee pumping plant, Bureau of Reclamation, Denver, Spec. 1254, to American Bridge Co., Pittsburgh.
- 240 Tons, Birmingham, building for government agencies, to Southern Steel Works Co., Birmingham, J. F. Holley, contractor.
- 190 Tons, Cache, Ill., bridge, Alexander County, Sec. 136F-2, to American Bridge Co., Pittsburgh.
- 162 Tons, Grand Coulee, Wash., coaster gate hoists for Grand Coulee pumping plant, Bureau of Reclamation, Denver, Spec. 1377, to McKiernan-Terry Corp.

- 100 Tons, Birmingham, freight house for Frisco Railroad, to Southern Steel Works Co., Birmingham, Day & Richardson, contractor.

• • • Fabricated steel inquiries this week included the following:

- 1700 Tons, Redland, Okla., reconstruction of bridge A-307, for Kansas City & Southern RR.
- 800 Tons, Sault Ste. Marie, Mich., power plant. Previously reported as abandoned.
- 400 Tons, West Springfield, Mass., power plant for Western Massachusetts Electric Co., Stone & Webster Engineering Corp., Boston, engineers.
- 350 Tons, Austin, Tex., highway span, State Highway Dept.
- 300 Tons, Omaha, Neb., alterations to bus terminal, Interstate Transit Co. of Omaha.
- 300 Tons, Morehead, Minn., pulp dryer building, American Crystal Sugar Co. Previously reported as abandoned.
- 200 Tons, Columbia, Miss., hosiery mill, Dye & Mullins, contractors.
- 200 Tons, Miami Beach, Fla., store building for David Allan.

• • • Reinforcing bar awards this week included the following:

- 2000 Tons, Bettendorf, Iowa, rolling mill, Aluminum Co. of America, to Carnegie-Illinois Steel Corp., Pittsburgh.
- 455 Tons, Great Lakes, Ill., U. S. Navy stor-

age building, to Joseph T. Ryerson & Son, Chicago.

- 220 Tons, Kankakee, Ill., building, General Foods Co., to Joseph T. Ryerson & Son, Chicago.

- 140 Tons, North Chicago, Ill., research laboratory, Abbott Laboratories, to Joseph T. Ryerson & Son, Chicago.

• • • Reinforcing bar inquiries this week included the following:

- 101 Tons, Lane County, Ore., Box Canyon Road bridge, Willamette National Forest, Public Roads Administration, Portland, bids open Sept. 27.

• • • Railroad car awards this week included the following: Baltimore & Ohio RR has placed orders for 500 70-ton hoppers with Pressed Steel Car Mfg. Co. and 500 70-ton hoppers with Pullman Standard Car Mfg. Co.

• • • Railroad car inquiries this week included the following: Union Pacific RR is inquiring for 1000 70-ton ballast cars and 1000 70-ton hoppers. Lehigh Valley is inquiring for 500 50-ton box cars. Pullman Standard Car Mfg. Co. is quoting on 1500 20-ton box cars and 1000 20-ton gondolas for the Turkish supply mission.

New Process Developed To Cut Melting Time Of Pig Iron, Scrap

Hamilton

• • • A new process worked out by E. T. W. Bailey, combustion engineer for the Steel Co. of Canada Ltd., and F. G. Kerry, head of the research department of Canadian Liquid Air Ltd., may cut the melting time of pig iron and scrap to 20 pct of normal. The new process is said to solve the long-standing problem of using oxygen to increase heat in openhearth furnaces.

Several successful tests have been made in furnaces at the Steel Co. of Canada, Hamilton works, and steelmakers at other plants in Canada are being given an opportunity to try out the new method in their own furnaces. Dominion Foundries & Steel, Hamilton, reported a successful test of the new Kerry-Bailey process recently.

Under the new process about 50 tons of oxygen or about 1,200,000 cu ft are required to keep an openhearth furnace going for 24 hr. The shooting of the oxygen and oil into the furnace required a special nozzle, which was developed by Mr. Kerry and his assistants, Gordon Allen, R. A. Dunn and T. Hugill.

In manufacturing oxygen for steel-making it is not necessary to make use of 99.8 pct purity, as is the case for other commercial uses, the purity may be dropped to 90 pct, it was said.

The largest producing plant of Canadian Liquid Air is located at Hamilton, and it has been supplying the Steel Company and other users with oxygen for lancing, welding, etc. For the openhearth test in melting pig iron and scrap, it was only necessary to pipe enough oxygen from the main pipeline into the furnace. The method by which the oxygen and oil are pumped into the furnace is the patentable part of

Tower to Speak

Cleveland

• • • Walter S. Tower, president, American Iron & Steel Institute, will be the principal speaker at the annual banquet of the American Society for Metals in Atlantic City, Nov. 21, according to W. H. Eisenman, national secretary of the society. The banquet will climax the ASM 28th annual convention, which is held as a part of the National Metal Congress and Exposition.

the process. Mr. Kerry and his engineers have devised a method whereby the flame intensity can be increased, decreased or directed at will to any portion of the furnace.

Actual tests were started in a 150-ton furnace at the Steel Co. of Canada Ltd., early this year, and it now is announced that the tests have been successful. It is pointed out that the furnace stood the extra heat without damage. It is claimed that this new process actually means that the normal melting time for pig iron and scrap of 10 to 14 hr has been cut to 2 to 4 hr, and it also is said to mean a saving in the fuel oil consumption. However, to obtain full benefit from the new process there would have to be considerable speeding up in pig iron production and processing of the steel as it comes from the openhearth.

The successful working of the new process might require the building of big low-cost oxygen plants in the vicinity of the plants that made use of the process. Insofar as the Hamilton mills are concerned, an official of Canadian Liquid Air pointed out that the present oxygen plant is sufficient to provide the required amount of oxygen.

MACHINE TOOLS

... News and Market Activities

Tool Distributors Decry WAA Sales Action

• • • While qualified observers in the machine tool industry foresaw in the early days of the war a long-enduring surplus machine tool problem as the logical sequel to tremendous war production, it has now become apparent to even the lay gentry that the industry will have a surplus problem for the next 12 to 15 yr.

At the same time, War Assets Administration in a helter-skelter effort to sell the surplus, is adding a good deal of fertilizer to the already rich soil in which the machine tool industry's surplus problem has its roots. WAA's plan, while not yet official, to sell certain tools in long supply in the surplus at as much as 50 pct under Clayton Formula prices, or at about 20¢ on the dollar, is no ordinary soil conditioner and accordingly, is particularly annoying to builders and dealers alike.

More than 100 members of the American Machine Tool Distributors Assn., meeting at Hot Springs, Va., for their 22nd annual meeting, prepared a resolution, after spirited and lengthy debate, condemning WAA's recent activities in no uncertain terms.

A. G. Bryant, president, Bryant Machinery & Engineering Co., minced no words in pointing out to AMTDA members that WAA's move to reduce prices 50 to 75 pct below formula was taken without previously consulting the machine tool advisory committee and evidenced a distinct tendency on the part of WAA to discard all reasonable, well considered advice available from experienced sources within the industry and to yield to pressure groups interested only in making a financial killing.

Legitimate dealers, he said, could not possibly sell machines at these "absurdly low prices," since the commission on such sales would not even approach the costs of selling. On the other hand, it must lead to speculation on the part of certain individuals who would purchase in considerable numbers, warehouse, and later

sell at high prices, thus bringing about a return of the scandalous conditions existing after World War I.

As concrete evidence of the lack of knowledge displayed by WAA officials, it was mentioned that all Heald machines are classified as being in long supply. Certain types, principally plain cylindrical grinders, are admittedly very numerous in the surplus, but other types are reported to be actually in heavy demand. Nevertheless, the ruling has been made and stands.

Complaints running a now familiar gamut were made by AMTDA members about payments of commissions, serious abuse of veterans priorities and the enormous quantities of small tools that have been given freely to schools and other institutions, thus completely drying up a normally profitable market.

While it has been reliably reported from government sources that WAA's price reduction will take place in the very near future, WAA is also canceling all lessee contracts on Oct. 6. And although it is heard in the bullrushes that most contractors say they will exercise their options and buy the tools, this WAA move will very likely mean another big shake-out in the surplus. Smart buyers will probably hang on to their money in a market of descending prices; some will buy and WAA will continue to sell lathes and shapers which are reported in short supply in surplus. All of this will mean that the man who builds only standard, general purpose machines, and is even now in a stock condition with a sizeable inventory on his hands, is in for a rough ride.

New firm orders held up well in August, for the industry as a whole, although reports ranged from spotty to good. In the same period, however, about as many machines were bought from WAA as from builders and distributors, which means that a good deal of equipment has been bought this

year, as well as last. According to some observers, this means industry is generally pretty well tooled up for the time being, and that a temporary slump in the machine tool market is just around the corner.

WAA's machine tool scrapping program has been of more significance from the machine tool industry view than as an aid in the acute scrap shortage. One WAA regional office has scrapped about 1500 tons of machine tools since issuance of the order on Aug. 16.

Shortages of electric motors and controls continue to hamper machine tool builders, and apparently little relief is in sight. A major producer of this equipment is currently quoting the following delivery dates: single and three-phase motors up to 15 hp, 52 weeks; over 15 hp, 65 to 70 weeks; fractional horsepower motors, 70 weeks; but it should be noted that delivery on fractional units varies; controls, one year; electronic controls, 1½ yr.

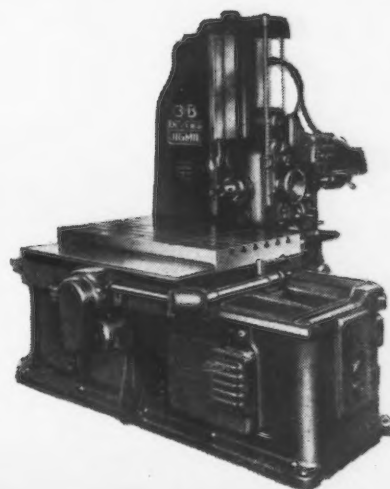
In Detroit, the continued demand for special purpose machine tools and a good volume of foreign orders has helped to maintain machine tool building in the area at a fairly good pace. Except for hold-up and cancellations resulting from "interruption" of the Chevrolet and Ford light car programs, there have been only normal cancellations.

In the case of General Motors, it is understood that machine tool suppliers have been requested to furnish information as to the present status of the work, cost to date and possibility of diverting machines to other uses. It is understood that GM will shortly make a survey of all tool orders currently placed and that some of these will be ordered completed and shipped, while others will be diverted after re-scheduling. In other cases, a settlement will be worked out with the supplier.

Evidence that the GM light car program has not been "canceled" is shown by the fact that some requests for quotations are still being placed by Chevrolet.

Automatic Precision

... beyond human skill
with push-button control



The Model 3-B JIGMIL

PROVIDES accuracy beyond human skill by push button control.

Automatic positioning between holes is controlled to within less than one ten-thousandth part of an inch.

Retraction and repositioning of the work for measuring or tool changing is by push button operation.

Any function is responsive to this centralized finger tip control.



The World's Finest BORING and Milling Machine

DeVLIEG MACHINE COMPANY

**DeVLIEG
JIGMIL**

**450 FAIR AVE. FERNDALE 20,
(Detroit) MICH.**

NONFERROUS METALS

... News and Market Activities

To Allocate Copper Scrap

Washington

• • • CPA has announced that because of shortages of copper and copper base alloy scrap, it will allocate such scrap sales by the Army, Navy and Maritime Commission. Procedure for allocation is made under Direction 22 to PR-13. It was pointed out however that any one lot of scrap aggregating less than five tons may be sold in the open market and is not subject to CPA allocation.

The owning agencies will no longer declare copper and copper base alloy scrap as surplus to WAA but will sell direct according to CPA allocation. WAA will dispose of whatever scrap is now in its possession in accordance with an Amended Direction 19 to PR-13, also effective Sept. 24, which requires that such scrap shall be sold to smelters or reproducers on their certification or to the RFC buying for smelters or reproducers.

OPA Denies Price Rise On Copper and Scrap

Washington

• • • A widening of the rift between CPA and OPA on pricing policy was seen in OPA's refusal on Sept. 20 to increase prices in the foreseeable future on primary and secondary copper, copper scrap, copper base alloy or brass mill scrap.

This impication was gathered by OPA's own announcement that CPA had advised the pricing agency that there are indications that the flow of copper and copper scrap is being slowed by withholding for an upward price adjustment. OPA said it made the announcement to end pricing un-

certainities with respect to copper to discourage any future withholding of copper or copper scrap in anticipation of a price increase. Moreover, it was added, CPA is studying its inventory controls over copper so as to provide maximum assistance in preventing the accumulation of excessive inventories of copper.

"Substantial price increases for copper and copper scrap were granted June 3, 1946," OPA pointed out. "Since the Premium Price Plan for copper, lead and zinc makes premiums available

Long Control Seen

New York

• • • There is strong sentiment in certain Washington circles for keeping controls on tin, antimony and lead for a considerable time after expiration of CPA, the present control agency, on Mar. 31, 1947. Some officials have quietly begun agitation to transfer controls on these items to a new agency before CPA expires.

for domestic mine production of these metals and the Reconstruction Finance Corp. is able to buy foreign copper at whatever price is necessary and to resell it at the domestic ceiling price, there is no necessity for an increase in copper ceiling prices in the foreseeable future," OPA said.

Sell Wire Plant

Washington

• • • Sale of the Anaconda Wire & Cable Co. war plant at Sycamore, Ill., to the Diamond Wire & Cable Co., for \$601,000 has been announced by the War Assets Administration. Used for production of field telephone wire during the war, the new owner expects to manufacture building and code wire. The sale included the land site of three acres, eight buildings and all machinery except 42 Starnder machines not needed by the new owner.

Zinc Stocks Unbalanced; Price Relief Rumored

New York

• • • Although the trade has been anticipating a price rise for several months no action has yet been announced although it has been reported that a price order has been formulated. With a world price reported at 10.50¢ to 11.00¢ per lb, the current domestic ceiling of 8.25¢ is not bringing out additional production or scrap recovery. The Office of Metals Reserve has been unwilling to bring in scrap at world prices with the stockpile as large as it is. However the reserve stocks are badly unbalanced with Prime Western and Special High Grade in serious short supply relative to the demand. Exports of zinc refined domestically from imported ores at the world prices continue. Although this requires obtaining an export license, these are apparently readily obtainable. These exports only make it more difficult for domestic consumers to obtain zinc or the grade needed for it is to be expected that the producers are taking advantage of the higher export prices. It is not necessary for producers to segregate production from the imported ores and therefore they are in a position to select the grades of metal for export.

Ferroalloy Prices Firm

New York

• • • A prominent ferroalloy producer reveals that there will be no price changes in its products during the rest of the year.

Nonferrous Metals Prices

Cents per pound

	Sept. 18	Sept. 19	Sept. 20	Sept. 21	Sept. 23	Sept. 24
Copper, electro., Conn.	14.375	14.375	14.375	14.375	14.375	14.375
Copper, Lake, Conn.	14.375	14.375	14.375	14.375	14.375	14.375
Tin, Straits, New York	52.00	52.00	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25	8.25	8.25
Lead, St. Louis	8.10	8.10	8.10	8.10	8.10	8.10

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NONFERROUS PRICES

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, f.o.b. shipping point (min. 10,000 lb)	15.00
Aluminum pig, f.o.b. shipping point	14.00
Antimony, American, Laredo, Tex.	14.50
Beryllium copper, 3.75-4.25% Be; dollars per lb contained Be.....	14.75
Beryllium aluminum, 5% Be; dollars per lb contained Be.....	30.00
Cadmium, del'd	11.25
Cobalt, 97-99% (per lb).....	\$1.50 to \$1.57
Copper, electro, Conn. Valley	14.375
Copper, electro, New York	14.125
Copper, lake, Conn. Valley	14.375
Gold, U. S. Treas., dollars per oz.	\$35.00
Iridium, 99.8%, dollars per troy oz.	2.25
Iridium, dollars per troy oz.	\$125.00
Lead, St. Louis	8.10
Lead, New York	8.25
Magnesium, 99.9 + %, carlots.....	20.50
Magnesium, 12-in. sticks, carlots.....	27.50
Mercury, dollars per 76-lb flask, f.o.b. New York	\$96 to \$99
Nickel, electro, f.o.b. refinery	35.00
Palladium, dollars per troy oz.	\$24.00
Platinum, dollars per troy oz.	\$93.00
Silver, New York, cents per oz.	90.125
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.69
Zirconium copper, 6 pct Zr, per lb contained Zr	\$ 6.00

Remelted Metals

(Cents per lb)

Aluminum, No. 12 Fdy. (No. 2)	13.25 to 13.50
Aluminum, deoxidizing No. 3	12.25 to 12.75
Aluminum, deoxidizing No. 4	12.00
Brass Ingot—culling prices	
85-5-5-5 (No. 115)	15.75
88-10-2 (No. 215)	19.00
80-10-10 (No. 305)	18.50
No. 1 Yellow (No. 405)	12.75

Copper, Copper Base Alloys

(Mill base, cents per lb)

	Extruded shapes	Rods	Sheets
Copper	25.66	25.81	
Copper, H.R.	22.16		
Copper drawn	23.16		
Low brass, 80%	24.35	24.66	
High brass		23.67	
Red brass, 85%	24.67	24.98	
Naval brass	23.84	22.59	28.53
Brass, free cut		18.53	
Commercial, bronze ..		25.50	25.81
Manganese bronze ..	27.45	25.95	32.03
Phosphor bronze, A, B, 5%		43.70	43.45
Muntz metal	23.59	22.34	26.78
Everdur, Herculey, Olympic or equal ..		29.82	30.88
Nickel silver, 5%		34.44	32.38
Architectural bronze.	22.50		

Aluminum

(Cents per lb, base, subject to extras for quantity, gage, size, temper and finish)

Drawn tubing: 2 to 3 in. OD by 0.065 in. wall: 3S, 43.5¢; 52S-O, 67¢; 24S-T, 71¢; base, 30,000 lb.

Plate: ¼ in. and heavier: 2S, 3S, 21.2¢; 52S, 24.2¢; 61S, 23.8¢; 24S, 24S-AL, 24.2¢; 75S, 75S-AL, 30.5¢; base, 30,000 lb and over.

Flat Sheet: 0.136-in. thickness: 2S, 3S, 23.7¢; 52S, 27.3¢; 61S, 24.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢; base, 30,000 lb and over.

Extruded Solid Shapes: factor determined by dividing the perimeter of the shape by its weight per foot. For factor 1 through 4, 3S, 26¢; 14S, 32.5¢; 24S, 35¢; 53S, 61S, 28¢; 63S, 27¢; 75S, 45.5¢; base, 30,000 lb.

Wire, Rod and Bar: screw machine stock, rounds, 17S-T, ¼ in., 29.5¢; ½ in., 27.5¢; 1 in., 26¢; 2 in., 24.5¢; hexagons, ¼ in., 35.5¢; ½ in., 30¢; 1 in., 2 in., 27¢; base, 5000 lb. Rod: 2S, 3S, 1¼ to 2½ in.

(Continued. See Next Column)

diam, rolled, 23¢; cold-finished, 23.5¢ base, 30,000 lb. Round Wire: drawn, coiled, B & S gage 17-18: 2S, 3S, 33.5¢; 56S, 39.5¢; 10,000 lb base; B & S gage 00-1: 2S, 3S, 21¢; 56S, 30.5¢; B & S 15-16: 2S, 3S, 22.5¢; 56S, 38¢; base, 30,000 lb.

NONFERROUS SCRAP METAL QUOTATIONS

†(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)

Copper, Copper Base Alloys

OPA Group 1†

No. 1 wire, No. 1 heavy copper...	11.50
No. 1 tinned copper wire, No. 1 tinned heavy copper	11.50
No. 2 wire, mixed heavy copper...	10.50
Copper tuyeres	10.50
Light copper	9.50
Copper borings, No. 1	11.50
No. 2 copper borings	10.50
Lead covered copper wire, cable.	
Lead covered telephone, power cable	
Insulated copper	

OPA Group 2†

Bell metal	17.25
High grade bronze gears.....	15.00
High grade bronze solids	
Low lead bronze borings	
Babbitt lined brass bushings	14.75
High lead bronze solids	
High lead bronze borings	
Red trolley wheels	12.50
Tinny (phosphor bronze) borings.	12.25
Tinny (phosphor bronze) solids.....	12.25
Copper-nickel solids and borings.	11.00
Bronze paper mill wire cloth	11.25
Aluminum bronze solids	10.75
Soft red brass (No. 1 composition) ..	10.75
Soft red brass borings (No. 1).....	10.75
Gilding metal turnings	10.25
Contaminated gilded metal solids..	10.25
Unlined standard red car boxes.....	10.00
Lined standard red car boxes.....	9.50
Cocks and faucets	9.50
Mixed brass screens	9.50
Red brass breakage	9.25
Old nickel silver solids	7.60
Old nickel silver borings	7.50
Copper lead solids, borings	6.75
Yellow brass castings	7.50
Automobile radiators	8.75
Zincy bronze solids, borings	9.75

OPA Group 3†

Fired rifle shells	9.50
Brass pipe	8.75
Old rolled brass	8.25
Admiralty condenser tubes	8.75
Muntz metal condenser tubes	8.25
Plated brass sheet, pipe reflectors ..	7.75
Manganese bronze solids	8.00 ¹
Manganese bronze solids	7.00 ²
Manganese bronze borings	7.25

OPA Group 4†

Refinery brass	6.00*
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*Price varies with analysis. ¹Lead content 0.00 to 0.40 pct. ²Lead content 0.41 to 1.00 pct.

Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb or more, 46¢ a lb; 25 to 90 lb, 56¢; less than 25 lb, 66¢.

Brass Mill Scrap†

Briquetted cartridge brass turnings	10.375
Cartridge brass turnings, loose...	9.625
Loose yellow brass trimmings.....	9.625

Aluminum

Plant scrap, segregated

2S solids	10.00 to 10.50
Dural alloys, solids 14, 17, 18.	
24S, 25S	8.00 to 8.50
turnings, dry basis	7.00 to 7.50
Low copper, alloys 51, 52, 61.	
63S solids	9.50 to 10.00
turnings, dry basis	8.50 to 9.00

Plant scrap, mixed

Solids	8.00 to 8.50
Turnings, dry basis	7.00 to 7.50

Obsolete scrap

Old sheet and utensils	9.00
Old castings and forgings.....	8.00 to 8.50
Pistons, free of struts	8.00

Magnesium*

Segregated plant scrap

Pure solids and all other solids, exempt Borings and turnings	1.50
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Mixed, contaminated plant scrap

Grade 1 solids	3.00
Grade 1 borings and turnings.....	2.00
Grade 2 solids	2.00
Grade 2 borings and turnings	1.00

*Nominal.

Zinc

New zinc clippings, trimmings ...	7.50
Engravers, lithographers plates ...	7.50
Old zinc scrap	5.75
Unswaged zinc dross	6.00
Die cast slab	5.50
New die cast scrap	5.45
Radiator grilles, old and new	4.50
Old die cast scrap	4.00

Lead

Deduct 1.40¢ a lb from refined metal basing point prices for refinery charge on used battery plates.

Soft lead scrap	7.50
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Nickel

Ni content 98+%, Cu under ½%, 23¢ per lb; 90 to 98% Ni, 23¢ per lb contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	29.75
Electrodeposited	23.47
Rolled, oval, straight, delivered..	23.72
Curved, 18 in. or longer, delivered	23.72
Brass, 80-20, frt allowed	
Cast, oval, 15 in. or longer.....	27.25
Zinc, cast, 99.99, 15 in. or longer..	17 ½
Nickel, 99 pct plus, frt allowed	
Cast	47
Rolled, depolarized	43
Silver, 999 fine	
Rolled, 100 oz. lots, per oz.	95 ½

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 1-5 bbls	34.00
Copper sulphate, 99.5, crystals, bbls	7.75
Nickel salts, single, 425 lb bbls, frt allowed	13.50
Silver cyanide, 100 oz lots, per oz.	0.749
Sodium cyanide, 96 pct, domestic, 125 lb drums.....	15.00
Zinc cyanide, 100 lb drums	33.00
Zinc sulphate, 89 pct, crystals, bbls, frt allowed	6.35

Poor Shipments Indicate Grim Winter Ahead

New York

• • • The current minor improvement in the flow of production scrap is just barely sufficient to meet present needs. Thus, as the fourth quarter begins, mills are coming face to face with the fact that winter stockpiles will be so small as to be almost repulsive.

The mills have long complained of inability to build up inventories to tide them over the winter months and some sources had hoped that favorable OPA price action would solve the problem. Other observers had predicted that even the price denial, positive as it was, would move vast quantities of hoarded material. But the price action was unfavorable and the definite OPA pronouncement can now be said to have had an insignificant effect on the steel scrap market.

Some mills have received substantial allocations of low phos scrap for their openhearth, others are trying to get them. Tie-in sales are still being made; they can't be traced because it is unnecessary to put the matter on paper. In addition, the practice is not new and many observers maintain that it would be difficult, if not impossible, to prove them to be illegal.

PITTSBURGH—Scrap has not started to move in this district in any particular increased volume, despite the fact that two mill consumers have obtained CPA permission to purchase low phos grades. Electric furnace and acid openhearth melters have protested to OPA the abolishment of classification No. 13, billet, bloom and forge crops, pointing out that many of their processes and products are dependent upon a free flow of that type of scrap. This week may see the beginning of a parade to Washington to obtain allocations.

CHICAGO—There are no signs here of an improvement in steelmaking scrap supplies and one of the larger operators in the district reports his inventory in exceedingly poor shape though he has not yet taken off any furnaces. Cast grades continue to be exceedingly tight and very little material is coming from auto wreckers.

DETROIT—After an initial spurt resulting from the movement of scrap already in freight cars or stored in anticipation of a price rise that didn't materialize, the Detroit scrap market has settled down to a pace that, according to most observers, is even lower than before the

recent OPA price edict. It is known that at least four scrap users including Great Lakes who would have been adversely hit by the low phos restriction have received permission to use automotive scrap in the open hearth.

BOSTON—The advance in prices has not increased supplies of cast, scarcity remaining the dominating factor. However, foundries are obtaining more low phos and shipments of turnings, borings and bundling material to steel mills are gathering momentum. Yards are not letting much heavy steel go, they are still nursing a grudge against the OPA for not lifting its price.

NEW YORK—Some brokers report cast grades again moving through broker channels though evidence indicates no significant improvement in overall volume. Small lots of cast scrap are still being sold at black market prices. Production lists are looking better, though tie-in sales continue. Because of labor costs for preparation, auto graveyards have shown little interest in anything but their spare parts business.

PHILADELPHIA—It seems to some observers of the scrap market here that there was some improvement in volume last week although there is no belief that the trend may continue. Dealers are still agitated over the proposed inventory control provisions of the government action. There are reports of large scale low phos movement to other districts under allocation. There has been no evidence of dealer allocations in this district yet and it is believed that involuntary allocations would be disregarded. Cast scrap is not available in appreciable volume here. Mill inventories are being reduced to permit current lowered operating rates.

CLEVELAND—With less scrap coming into dealers' yards and shipments falling off proportionately, the number of allocations being issued is rapidly making a burlesque of OPA's new scrap regulation. In the trade, charges and counter-charges are being made of allocations being issued to consumers who did not need them. Very little additional cast has come out as a result of the higher prices, which leaves many of the foundries about where they were before. Mill inventories are down to the point where one bad day on shipments may mean a shut down and with the holidays coming up, this seems quite possible.

ST. LOUIS—Shipments of scrap iron to steel mills in the St. Louis area have increased only about 10 pct within the last week, dealers still being hesitant to move the material because of low prices. Collection of material also is said to have halted because the dealers are unable to pay more.

BUFFALO—Receipts of steel making scrap have increased to the point where

most leading consumers are able to break even, although stockpiling still is out of the question. One dealer has taken an order for 10,000 tons from a local mill and a 5000 ton cargo arrived from the lakehead by boat this week. The flurry of business in cast iron scrap, mostly in lots from 100 to 500 tons which followed the price advance, has subsided and sellers are reported busily engaged in scouting around for the material to make deliveries.

BIRMINGHAM—The price increase for cast iron grades granted by OPA has failed to boost the flow of that material to any substantial extent in this market. Cast that formerly came here from North Carolina is moving now to Eastern points as a result of the increased price f.o.b. shipping point and the higher freight rate to Birmingham. Shipments of steel grades continue to lag.

CINCINNATI—The market here is in a definite slump, the worst yet, because of the OPA action. Both mills and dealers indicate that production will be at a complete stand-still unless some relief is forthcoming. Some mills report a 10-day inventory, and others that their production is "hanging on the ropes." Dealers in this area report they are down to 25 pct of their normal pre-war business, and are delving in other lines to make up for deficits in their yards.

TORONTO—The continuation of the steel strike has put foundrymen in a frenzy to secure cast grades to make up for strike-lost pig iron. Meanwhile, industrial production is being still further reduced by the strike and bringing about a shortage which observers expect will be felt this winter.

WAA to Lease Shipyards

Washington

• • • WAA announced on Monday that minimum rentals set at about 40 pct of the normal rates have been established for surplus shipyards to be used by shipbreakers. WAA regional offices will deal directly with qualified contractors in the leasing of these properties which are being held in reserve until the needs of the ship scrapping program have been determined.

Rentals are based on facilities used and amounts of scrap produced. These tonnages are based on the invoiced quantities shipped out of the various yards monthly.

Shipbreakers can obtain detailed information from the WAA regional offices in the areas where they propose to operate. Bonds will be requested to insure that leased facilities are properly cared for and scrapping operations completed.

IRON AND STEEL SCRAP PRICES

PITTSBURGH

Per gross ton delivered to consumer:
Cast grade f.o.b. shipping point

No. 1 hvy. melting	\$20.00*
RR. hvy. melting	21.00*
No. 2 hvy. melting	20.00*
RR. scrap rails	21.50*
Rails 3 ft. and under	23.50*
No. 1 comp'd sheets	20.00*
Hand bldd. new shts.	20.00*
Hvy. axle turn.	19.50*
Hvy. steel forge turn.	19.50*
Mach. shop turn.	15.00*
Short shov. turn.	17.00*
Mixed bor. and turn.	15.00*
Cast iron borings	16.00*
No. 1 cupola cast.	25.00*
Charging box cast.	21.00*
Heavy breakable cast.	20.00*
Burnt cast.	17.75*
Malleable	24.00*
RR. knuck. and coup.	24.50*
RR. coil springs	24.50*
Rail leaf springs	24.50*
Rolled steel wheels	24.50*
Low phos.	22.50*

CHICAGO

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

No. 1 hvy. melting	\$18.75*
No. 2 hvy. melting	18.75*
No. 1 bundles	18.75*
No. 2 dealers' bndls.	18.75*
Bundled mach. shop turn.	18.75*
Galv. bundles	16.75*
Mach. shop turn.	13.75*
Short shovels, turn.	15.75*
Cast iron borings	14.75*
Mix. borings & turn.	13.75*
Low phos. hvy. forge	23.75*
Low phos. plates	21.25*
No. 1 RR. hvy. melt.	19.75*
Reroll rails	22.25*
Miscellaneous rails	20.25*
Angles & splice bars	22.25*
Locomotive tires, cut	24.25*
Cut bolsters & side frames	22.25*
Standard stl. car axles	25.75*
No. 3 steel wheels	23.25*
Couplers & knuckles	23.25*
Malleable	24.00*
No. 1 mach. cast.	20.00*
Rails 3 ft. and under	22.25*
No. 1 agricul. cast.	20.00*
Hvy. breakable cast.	20.00*
RR. grate bars	15.25*
Cast iron brake shoes	17.75*
Stove plate	23.00*
Clean auto cast.	27.00*
Cast iron carwheels	22.00*

CINCINNATI

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

No. 1 hvy. melting	\$19.50*
No. 2 hvy. melting	19.50*
No. 1 bundles	19.50*
No. 2 bundles	19.50*
Mach. shop turn.	\$10.50 to 11.00
Shoveling turn.	12.50 to 13.00
Cast iron borings	11.50 to 12.00
Mixed bor. & turn.	11.50 to 12.00
Low phos. plate	22.00*
No. 1 cupola cast.	25.00*
Hvy. breakable cast.	20.00*
Stove plate	23.00*
Scrap rails	21.00*

BOSTON

Dealers' buying prices per gross ton,
f.o.b. cars

No. 1 hvy. melting	\$15.05*
No. 2 hvy. melting	15.05*
Nos. 1 and 2 bundles	15.05*
Busheling	15.05*
Turnings, shoveling	12.05*
Machine shop turn.	10.05*
Mixed bor. & turn.	10.05*
Cl'n cast, chem. bor.	\$13.06 to 14.15*
No. 1 machinery cast.	25.00*
No. 2 machinery cast.	21.00*
Breakable cast.	20.00*
Stove plate	23.00*

DETROIT

Per gross ton, brokers' buying prices:

No. 1 hvy. melting	\$17.32*
No. 2 hvy. melting	17.32*
No. 1 bundles	17.32*
New busheling	17.32*
Flashings	17.32*
Mach. shop turn.	12.32*
Short shov. turn.	14.32*

Going prices as obtained in the trade
by IRON AGE editors, based on rep-
resentative tonnages. Where asterisks
are used they indicate the OPA
ceiling price to which must be added
brokerage fee and adjusted freight.

Cast iron borings	13.32*
Mixed bor. & turn.	12.32*
Low phos. plate	19.82*
No. 1 cupola cast.	25.00*
Charging box cast.	21.00*
Hvy. breakable cast.	20.00*
Stove plate	23.00*
Automotive cast.	27.00*

PHILADELPHIA

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

No. 1 hvy. melting	\$18.75*
No. 2 hvy. melting	18.75*
No. 2 bundles	18.75*
Mach. shop turn.	13.75*
Shoveling turn.	15.75*
Cast iron borings	14.75*
Mixed bor. & turn.	13.75*
No. 1 cupola cast.	25.00*
Hvy. breakable cast.	20.00*
Cast. charging box	21.00*
Clean auto cast.	27.00*
Hvy. axle forge turn.	15.25*
Low phos. plate	21.25*
Low phos. punchings	21.25*
RR. steel wheels	23.25*
RR. coil springs	23.25*
RR. malleable	22.00*

ST. LOUIS

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

Heavy melting	\$17.50*
Bundled sheets	17.50*
Mach. shop turn.	12.50*
Locomotive tires, uncut	21.00*
Misc. std. sec. rails	19.00*
Rerolling rails	21.00*
Steel angle bars	21.00*
Rails 3 ft and under	21.50*
RR. springs	22.00*
Steel car axles	24.50*
Stove plate	23.00*
Grate bars	15.25*
Brake shoes	17.75*
Malleable	24.00*
Cast iron carwheels	22.00*
No. 1 mach'ry cast.	22.00*
Breakable cast.	20.00*

BIRMINGHAM

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

No. 1 hvy. melting	\$17.00*
No. 2 hvy. melting	17.00*
No. 2 bundles	17.00*
No. 1 busheling	17.00*
Long turnings	12.00*
Shoveling turnings	14.00*
Cast iron borings	13.00*
Bar crops and plate	\$18.50 to 19.50*
Structural and plate	18.50 to 19.50*
No. 1 cast.	25.00*
Stove plate	23.00*
Steel axles	18.50*
Scrap rails	18.50*
Rerolling rails	20.50*
Angles & splice bars	20.50 to 21.00*
Rails 3 ft. & under	21.00*
Cast iron carwheels	22.00*

YOUNGSTOWN

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

No. 1 hvy. melting	\$20.00*
No. 2 hvy. melting	20.00*
Low phos. plate	22.50*
No. 1 busheling	20.00*
Hydraulic bundles	20.00*
Mach. shop turn.	15.00*
Short shovel. turn.	17.00*
Cast iron borings	16.00*

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	\$15.33*
No. 2 hvy. melting	15.33*
Comp. black bundles	15.33*
Comp. galv. bundles	13.33*
Mach. shop turn.	10.33*
Mixed bor. & turn.	10.33*
Shoveling turn.	12.33*
No. 1 cupola cast.	25.00*

Hvy. breakable cast.	20.00*
Charging box cast.	21.00*
Stove plate	23.00*
Clean auto cast.	27.00*
Unstrip. motor blks.	20.00*
Cl'n chem. cast bor.	14.33*

BUFFALO

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

No. 1 hvy. melting	\$19.25*
No. 1 bundles	19.25*
No. 2 bundles	19.25*
No. 2 hvy. melting	19.25*
Mach. shop turn.	14.25*
Shoveling turn.	16.25*
Cast iron borings	15.25*
Mixed bor. & turn.	14.25*
No. 1 cupola cast.	25.00*
Charging box cast.	21.00*
Stove plate	23.90*
Clean auto cast.	27.00*
Malleable	24.00*
Low phos. plate	21.75*
Scrap rails	20.75*
Rails 3 ft. & under	22.75*
RR. steel wheels	23.75*
Cast iron carwheels	22.00*
RR. coil & leaf spg.	23.75*
RR. knuckles & coup.	23.75*
No. 1 busheling	19.25*

CLEVELAND

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

No. 1 hvy. melting	\$19.50*
No. 2 hvy. melting	19.50*
Compressed sheet stl.	19.50*
Drop forge flashings	19.00*
No. 2 bundles	19.50*
Mach. shop turn.	14.50*
Short shovel.	16.50*
No. 1 busheling	19.50*
Steel axle turn.	19.00*
Cast iron borings	15.50*
Mixed bor. & turn.	14.50*
No. 2 busheling	17.00*
No. 1 machinery cast.	25.00*
Malleable	24.00*
Railroad cast	20.00*
Railroad grate bars	15.25*
Stove plate	23.00*
RR. hvy. melting	20.50*
Rails 3 ft. & under	23.00*
Rails 18 in. & under	24.25*
Rails for rerolling	23.00*
Elec. furnace punch	22.00*

SAN FRANCISCO

Per gross ton delivered to consumer:
Cast grade f.o.b. shipping point

RR. hvy. melting	\$18.00*
No. 1 hvy. melting	17.00*
No. 2 hvy. melting	17.00*
No. 2 bales	\$15.00 to 15.75
No. 3 bales	8.50 to 9.25
Mach. shop turn.	6.50 to 7.25
Elec. furn. 1 ft. und.	15.50 to 17.00
No. 1 cupola cast.	19.00 to 21.00

LOS ANGELES

Per gross ton delivered to consumer:
Cast grade f.o.b. shipping point

No. 1 hvy. melting	\$17.00*
No. 2 hvy. melting	17.00*
No. 1 bales	\$16.00 to 17.00
No. 2 bales	15.50 to 16.00
No. 3 bales	8.00 to 9.00
Mach. shop turn.	7.00
No. 1 cupola cast.	19.90 to 21.00

SEATTLE

Per gross ton delivered to consumer:
Cast grade f.o.b. shipping point

RR. hvy. melting	\$14.50*
No. 1 & No. 2 hvy. melting	14.50*
Elec. furn. 1 ft. und.	\$14.00 to 15.00
No. 1 cupola cast.	25.00*

HAMILTON, ONT.

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

Heavy melting	\$17.50*
No. 1 bundles	17.50*
No. 2 bundles	17.00*
Mixed steel scrap	15.50*
Rails, remelting	18.50*
Rails, rerolling	21.50*
Bushelings	13.00*
Mixed borings & turnings	12.50*
Electric furnace bundles	20.50*
Manganese steel scrap	20.00*
No. 1 cast	19.00*
Stove plate	17.50*
Car wheels, cast	19.50*
Malleable iron	16.00*

Comparison of Prices . .

Advances over past week in Heavy Type; declines in Italics. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-Rolled Steel:	Sept. 24, 1946	Sept. 17, 1946	Aug. 20, 1946	Sept. 25, 1945
(cents per pound)				
Hot-rolled sheets	2.425	2.425	2.425	2.20
Cold-rolled sheets	3.275	3.275	3.275	3.05
Galvanized sheets (24 ga.)	4.05	4.05	4.05	3.70
Hot-rolled strip				
6-in. and under	2.45	2.45	2.45	2.10
Over 6 in.	2.35	2.35	2.35	2.10
Cold-rolled strip	3.05	3.05	3.05	2.80
Plates	2.50	2.50	2.50	2.25
Plates, wrought iron	4.112	4.112	4.112	3.80
Stain's c-r strip (No. 302)	30.30	30.30	30.30	28.00

Tin and Terneplate:	Sept. 24, 1946	Sept. 17, 1946	Aug. 20, 1946	Sept. 25, 1945
(dollars per base box)				
Tinplate, standard cokes	\$5.00	\$5.00	\$5.00	\$5.00
Tinplate, electro (0.50 lb)	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30

Bars and Shapes:	Sept. 24, 1946	Sept. 17, 1946	Aug. 20, 1946	Sept. 25, 1945
(cents per pound)				
Merchant bars	2.50	2.50	2.50	2.25
Cold-finished bars	3.10	3.10	3.10	2.75
Alloy bars	2.92	2.92	2.92	2.70
Structural shapes	2.35	2.35	2.35	2.10
Stainless bars (No. 302)	25.97	25.97	25.97	24.00
Wrought iron bars	4.76	4.76	4.76	4.40

Wire and Wire Products:	Sept. 24, 1946	Sept. 17, 1946	Aug. 20, 1946	Sept. 25, 1945
(cents per pound)				
Bright wire	3.05	3.05	3.05	2.75
Wire nails	3.75	3.75	3.75	2.90

Rails:	Sept. 24, 1946	Sept. 17, 1946	Aug. 20, 1946	Sept. 25, 1945
(dollars per net ton)				
Heavy rails	\$43.39	\$43.39	\$43.39	\$43.00*
Light rails	49.18	49.18	49.18	45.00*
*per gross ton				

Semifinished Steel:	Sept. 24, 1946	Sept. 17, 1946	Aug. 20, 1946	Sept. 25, 1945
(dollars per gross ton)				
Rerolling billets	\$39.00	\$39.00	\$39.00	\$36.00
Sheet bars	38.00	38.00	38.00	36.00
Slabs, rerolling	39.00	39.00	39.00	36.00
Forging billets	47.00	47.00	47.00	42.00
Alloy blooms, billets, slabs	58.43	58.43	58.43	54.00

Wire Rods and Skelp:	Sept. 24, 1946	Sept. 17, 1946	Aug. 20, 1946	Sept. 25, 1945
(cents per pound)				
Wire rods	2.30	2.30	2.30	2.15
Skelp	2.05	2.05	2.05	1.90

Pig Iron*:	Sept. 24, 1946	Sept. 17, 1946	Aug. 20, 1946	Sept. 25, 1945
(per gross ton)				
No. 2 foundry, Phila.	\$30.43	\$30.43	\$30.43	\$26.84
No. 2, Valley furnace	28.50	28.50	28.50	25.00
No. 2, Southern, Cin'ti.	27.80	27.80	27.80	25.44
No. 2, Birmingham	24.88	24.88	24.88	21.38
No. 2 foundry, Chicago†	28.50	28.50	28.50	25.00
Basic, del'd eastern Pa.	29.93	29.93	29.93	26.34
Basic, Valley furnace	28.00	28.00	28.00	24.50
Malleable, Chicago†	28.50	28.50	28.50	25.00
Malleable, Valley	28.50	28.50	28.50	25.00
L. S. charcoal, Chicago	42.34	42.34	42.34	42.34
Ferromanganese†	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is 60¢ per ton.
‡ For carlots at seaboard.

* Prices retroactive to May 29; the price increase should be reflected in THE IRON AGE Comparison of Prices table since June 4.

Scrap:	Sept. 24, 1946	Sept. 17, 1946	Aug. 20, 1946	Sept. 25, 1945
(per gross ton)				
Heavy melt'g steel, P'gh.	\$20.00	\$20.00	\$20.00	\$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.32	17.32	17.32	17.32
Low phos. plate, Youngs'n	22.50	22.50	22.50	22.50
No. 1, cast, Pittsburgh	25.00	25.00	25.00	25.00
No. 1 cast, Philadelphia	25.00	25.00	25.00	25.00
No. 1 cast, Chicago	25.00	25.00	25.00	25.00

Coke, Connellsville:	Sept. 24, 1946	Sept. 17, 1946	Aug. 20, 1946	Sept. 25, 1945
(per net ton at oven)				
Furnace coke, prompt	\$8.75	\$8.75	\$7.50	\$7.50
Foundry coke, prompt	8.50	8.50	8.50	9.00

Nonferrous Metals:	Sept. 24, 1946	Sept. 17, 1946	Aug. 20, 1946	Sept. 25, 1945
(cents per pound to large buyers)				
Copper, electro., Conn.	14.375	14.375	14.375	12.00
Copper, Lake, Conn.	14.375	14.375	14.375	12.00
Tin, Straits, New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25
Lead, St. Louis	8.10	8.10	8.10	6.35
Aluminum, virgin	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	14.50	14.50	14.50	14.50

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite prices for the current quarter are an estimate based on finished steel shipments for the previous quarter. These figures will be revised when the actual data of shipments for this quarter are compiled.

Composite Prices . .

FINISHED STEEL					PIG IRON					SCRAP STEEL										
Sept. 24, 1946.....2.73011¢ per lb.....					.....\$28.13 per gross ton.....					.....\$19.17 per gross ton.....								
One week ago .....2.73011¢ per lb.....					.....\$28.13 per gross ton.....					.....\$19.17 per gross ton.....								
One month ago.....2.73011¢ per lb.....					.....\$28.13 per gross ton.....					.....\$19.17 per gross ton.....								
One year ago.....2.44076¢ per lb.....					.....\$24.61 per gross ton.....					.....\$19.17 per gross ton.....								
HIGH					LOW					HIGH					LOW					
1946.....	2.73011¢	July	4	2.54490¢	Jan.	1	\$28.13	May	29	\$25.37	Jan.	1	\$19.17							
1945.....	2.44104¢	Oct.	2	2.38444¢	Jan.	2	25.37	Oct.	23	23.61	Jan.	2	\$19.17	Jan.	2					
1944.....	2.30837¢	Sept.	5	2.21189¢	Oct.	5	\$23.61			\$23.61			19.17	Jan.	11					
1943.....	2.29176¢			2.29176¢			23.61			23.61			\$19.17							
1942.....	2.28249¢			2.28249¢			23.61			23.61			19.17							
1941.....	2.43078¢			2.43078¢			\$23.61	Mar.	20	\$23.45	Jan.	2	\$22.00	Jan.	7					
1940.....	2.30467¢	Jan.	2	2.24107¢	Apr.	16	23.45	Dec.	23	22.61	Jan.	2	21.83	Dec.	30					
1939.....	2.35367¢	Jan.	3	2.26689¢	May	16	22.61	Sept.	19	20.61	Sept.	12	22.50	Oct.	3					
1938.....	2.58414¢	Jan.	4	2.27207¢	Oct.	18	23.25	June	21	19.61	July	6	15.00	Nov.	22					
1937.....	2.58414¢	Mar.	9	2.32263¢	Jan.	4	23.25	Mar.	9	20.25	Feb.	16	21.92	Mar.	30					
1936.....	2.32263¢	Dec.	28	2.05200¢	Mar.	10	19.74	Nov.	24	18.73	Aug.	11	17.75	Dec.	21					
1935.....	2.07642¢	Oct.	1	2.06492¢	Jan.	8	18.84	Nov.	5	17.83	May	14	13.42	Dec.	10					
1934.....	2.15367¢	Apr.	24	1.95757¢	Jan.	2	17.90	May	1	16.90	Jan.	27	13.00	Mar.	13					
1933.....	1.95578¢	Oct.	3	1.75836¢	May	2	16.90	Dec.	5	13.56	Jan.	3	12.25	Aug.	8					
1932.....	1.89196¢	July	5	1.83901¢	Mar.	1	14.81	Jan.	5	13.56	Dec.	6	8.50	Jan.	12					
1931.....	1.99626¢	Jan.	13	1.86586¢	Dec.	29	15.90	Jan.	6	14.79	Dec.	15	11.33	Jan.	6					
1930.....	2.25488¢	Jan.	7	1.97319¢	Dec.	9	18.21	Jan.	7	15.90	Dec.	16	15.00	Feb.	18					
1929.....	2.31773¢	May	28	2.26498¢	Oct.	29	18.71	May	14	18.21	Dec.	17	17.58	Jan.	29					
Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 73 pct of the United States output. Index recapitulated in Aug. 28, 1941, issue.							Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo Valley and Birmingham.							Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.						

J&L OTISCOLOY

A STRONGER STEEL PERMITS
LIGHTER CONSTRUCTION • REDUCES
DEAD-WEIGHT • INCREASES PAYLOAD

**J&L
STEEL**

Otiscoloy is 40% stronger than ordinary steel. Its high strength is obtained without mechanical working or heat-treating which permits great workability. Otiscoloy is also resistant to abrasion and corrosion.

★ Otiscoloy is used in freight cars to reduce weight by as much as 5½ tons per car. Also used in mine cars, trucks, barges, stripping shovels.

★ Otiscoloy used in coal chutes and backstops reduces wear by abrasion and atmospheric corrosion, and eliminates many costly repairs.

Write for Otiscoloy booklet.

JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH 30, PENNSYLVANIA

THE IRON AGE, September 26, 1946—131

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. basing points, in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 8 pct tax on freight. (1) Mill run sheet, 10¢ per 100 lb under base; primes, 25¢ above base. (2) Unassorted commercial coating. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25¢ per 100 lb to fabricators. (8) Also shafting. For quantities of 20,000 lb to 39,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (11) Boxed. (12) This base price for annealed, bright finish wire, commercial spring wire. (13) Produced to dimensional tolerances in AISI Manual Sect. 6. (14) Billets only. (15) 9/32 in. to 47/64 in., 0.15¢ per lb higher.

Basing Points	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	10 Pacific Ports, Cars	DELIVERED TO		
													Detroit	New York	Phila- delphia
INGOTS															
Carbon, rerolling															
Carbon, forging	\$38	\$38	\$38	\$38	\$38	\$38	\$38								
Alloy.....	\$48.69	\$48.69				\$48.69									
BILLETS, BLOOMS, SLABS															
Carbon, rerolling	\$39	\$39	\$39	\$39	\$39	\$39	\$39	\$39				\$51 ¹⁴	\$41		
Carbon, forging billets.....	\$47	\$47	\$47	\$47	\$47	\$47	\$47					\$59 ¹⁴	\$49		
Alloy	\$58.43	\$58.43				\$58.43							\$60.43		
SHEET BARS	\$38	\$38		\$38		\$38	\$38	\$38							
PIPE SKELP	2.05¢	2.05¢					2.05¢	2.05¢							
WIRE RODS ¹⁵															
No. 5 to 3/32 in.	2 30¢	2.30¢		2.30¢	2.30¢							2.55¢	2.80¢		
SHEETS															
Hot-rolled	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.525¢	2.425¢		2.975¢	2.525¢	2.685¢	2.615¢
Cold-rolled ¹	3.275¢	3.275¢	3.275¢	3.275¢		3.275¢	3.275¢		3.375¢	3.275¢		3.925¢	3.375¢	3.615¢	3.635¢
Galvanized (24 gage)	4.05¢	4.05¢	4.05¢		4.05¢	4.05¢	4.05¢	4.05¢	4.15¢	4.05¢		4.60¢		4.31¢	4.24¢
Enameling (20 gage)	3.80¢	3.80¢	3.80¢	3.80¢			3.80¢		3.90¢	3.80¢		4.45¢	3.90¢	4.20¢	4.16¢
Enameling (10 Gage)	3.20¢	3.20¢	3.20¢	3.20¢			3.20¢		3.30¢	3.20¢		3.85¢	3.30¢	3.60¢	3.56¢
Long ternes ²	4.05¢	4.05¢	4.05¢									4.80¢		4.45¢	4.41¢
STRIP															
Hot-rolled 3/16 in. and under over 6 in.	2.45¢ 2.35¢	2.45¢ 2.35¢	2.45¢ 2.35¢	2.45¢ 2.35¢	2.45¢ 2.35¢		2.45¢ 2.35¢			2.45¢ 2.35¢		3.10¢ 3.00¢	2.55¢ 2.45¢	2.85¢ 2.75¢	2.81¢ 2.71¢
Cold-rolled ⁴	3.05¢	3.15¢		3.05¢			3.05¢						3.15¢	3.45¢	3.41¢
Cooperage stock	2.55¢	2.55¢			2.55¢		2.55¢							2.95¢	
TINPLATE															
Standard cokes, base box	\$5.00	\$5.00	\$5.00		\$5.10			\$5.10	\$5.10					\$5.375	\$5.301
Electro, box															
(0.25 lb	\$4.35	\$4.35	\$4.35					\$4.35							
(0.50 lb	\$4.50	\$4.50	\$4.50					\$4.60	\$4.60						
(0.75 lb	\$4.65	\$4.65	\$4.65					\$4.75	\$4.75						
BLACKPLATE															
29 gage ⁵	3.30¢	3.30¢	3.30¢					3.40¢	3.40¢					3.67¢	3.59¢
TERNES, MFG.															
Special coated, base box	\$4.30	\$4.30	\$4.30					\$4.40	\$4.40						
BAR															
Carbon steel	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢				2.85¢	3.15¢	2.60¢	2.84¢	2.86¢
Rail steel ⁶	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢					2.85¢	3.15¢			
Reinforcing (billet) ⁷	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢			2.70¢	2.75¢	2.45¢	2.61¢	2.69¢
Reinforcing (rail) ⁷	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢				2.70¢	2.75¢	2.45¢		
Cold-finished ⁸	3.10¢	3.10¢	3.10¢	3.10¢		3.10¢								3.44¢	3.46¢
Alloy, hot-rolled	2.92¢	2.92¢				2.92¢	2.92¢						3.02¢		
Alloy, cold-drawn	3.62¢	3.62¢	3.62¢	3.62¢		3.62¢							3.73¢		
PLATE															
Carbon steel ¹³	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢		2.50¢							2.71¢	2.558¢
Floor plates	3.75¢	3.75¢									4.10¢	4.40¢		4.15¢	4.15¢
Alloy	3.79¢	3.79¢									4.27¢	4.49¢		4.01¢	3.895¢
SHAPES															
Structural	2.35¢	2.35¢	2.35¢		2.35¢	2.35¢					2.70¢	3.00¢		2.54¢	2.48¢
SPRING STEEL, C-R ¹⁶															
0.26 to 0.50 carbon	3.05¢			3.05¢											
0.51 to 0.75 carbon	4.65¢			4.65¢											
0.76 to 1.00 carbon	6.65¢			6.65¢											
1.01 to 1.25 carbon	9.03¢			9.03¢											
WIRE ⁹															
Bright ¹²	3.05¢	3.05¢		3.05¢	3.05¢							3.55¢		3.44¢	3.41¢
Galvanized															
Spring (high carbon)	4.00¢	4.00¢		4.00¢								4.50¢		4.39¢	4.339¢
PILING															
Steel sheet	2.65¢	2.65¢				2.65¢						3.20¢		2.99¢	3.01¢

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

BASING POINT	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila.	Subject to negotiation		Subject to negotiation			
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt.	22.99	24.67	17.01	17.47	20.69	25.29
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	22.99	24.67	17.01	17.47	20.69	25.29
Billets, P'gh, Chi, Canton, Newark, N. J., Watervliet, Syracuse, Balt.	Subject to negotiation		Subject to negotiation			
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Watervliet, Syracuse, Newark, N. J., Ft. Wayne, Titusville	22.99	24.67	17.01	17.47	20.69	25.29
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Newark, N. J., Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville	27.05	25.97	20.02	20.56	24.34	29.75
Bars, c-f, P'gh, Chi, Clevel, Canton, Dunkirk, Newark, N. J., Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet	27.05	25.97	20.02	20.56	24.34	29.75
Plates, P'gh, Middletown, Canton	31.38	29.21	23.28	23.80	28.67	33.90
Shapes, structural, P'gh, Chi	27.05	25.97	20.02	20.56	24.34	29.75
Sheets, P'gh, Chi, Middletown, Canton, Balt.	38.95	36.79	28.67	31.38	35.16	38.49
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown	25.43	23.28	18.39	18.93	25.97	37.67
Strip, c-f, P'gh, Clevel, Newark, N. J., Reading, Canton, Youngstown	32.48	30.30	23.80	24.34	34.62	36.28
Wire, c-d, Clevel, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila.	27.05	25.97	20.02	20.56	24.34	29.75
Wire, flat, c-f, Clevel, Balt, Reading, Dunkirk, Canton	32.48	30.30	23.80	24.34	34.62	36.28
Rod, h-r, Newark, N. J., Syracuse	27.05	25.97	20.02	20.56	24.34	29.75
Tubing, seamless, P'gh, Chi, Canton, (4 in. to 6 in.)	72.09	72.09	.....	68.49	.....	.....

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, O.)

An increase of 8.2 pct applies to base price and extras

	Base per lb
High speed	67¢
Straight molybdenum	54¢
Tungsten-molybdenum	57½¢
High-carbon-chromium*	43¢
Oil hardening*	24¢
Special carbon*	22¢
Extra carbon*	18¢
Regular carbon*	14¢

Warehouse prices on and east of Mississippi are 2¢ per lb higher; west of Mississippi 3¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	per lb
Field grade	3.90¢
Armature	4.25¢
Electrical	4.75¢
Motor	5.425¢
Dynamo	6.125¢
Transformer 72	6.625¢
Transformer 65	7.625¢
Transformer 58	8.125¢
Transformer 52	8.925¢

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo. Pacific ports add 75¢ per 100 lb on all grades.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb No. 1 O.H., net ton	\$43.39
Angle splice bars, 100 lb	2.85
(F.o.b. basing points) per net ton	
Light rails (from billets)	\$49.18
Light rails (from rail steel)	49.18

	base per lb
Cut spikes	3.65¢
Screw spikes	*5.15¢
Tie plate, steel	2.55¢
Tie plates, Pacific Coast	2.70¢
Track bolts	6.50¢
Track bolts, heat treated, to railroads	6.75¢
Track bolts, jobbers discount	63-5

*Plus 12 pct.
Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo, Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25¢.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

	20x14 in.	20x28 in.
8-lb coating I.C.	\$8.50	\$17.00
15-lb coating I.C.	9.50	19.00
30-lb coating I.C.	10.00	20.00

CLAD STEEL

Base prices, cents per pound

	Plate	Sheet
Stainless-clad		
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Pa.	21.00*	22.00
Nickel-clad		
10 pct, f.o.b. Coatesville, Pa.	18.72	.....
Inconel-clad		
10 pct, f.o.b. Coatesville..	26.00	.....
Monel-clad		
10 pct, f.o.b. Coatesville..	24.96	.....
Aluminized steel		
Hot dip, 20 gage, f.o.b. Pittsburgh .....	.....	9.00

*Includes annealing and pickling.

WIRE PRODUCTS

To the dealer, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Basing Points Named	Coast Basing Points†
Standard wire nails ...	\$3.75	\$4.25
Coated nails	3.75	4.25
Cut nails, carloads	4.85	.....
base per keg		
Annealed fence wire ..	\$3.50	\$4.00
Annealed galv. fence wire	3.85	4.35
base per 100 lb		
Woven wire fence*	72	90
Fence posts, carloads...	74	91
Single loop bale ties†..	72	97
Galvanized barbed wire**	79	89
Twisted barless wire..	79	89

*15½ gage and heavier. **On 80-rod spools in carload quantities.

†Prices subject to switching or transportation charges.

††Add 50¢ a ton.

HIGH TENSILE, LOW ALLOY STEELS

base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dynalloy	Hi Steel	Mayari R	Otiscoloy	Yoloy	Y-50
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	American Rolling Mill
Plates	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	.....
Sheets									
Hot-rolled	3.575	3.575	3.575	3.575	3.575	3.575	3.575	3.575	.....
Cold-rolled	4.525	4.525	4.525	.....	4.525	4.525	4.525	4.525	5.225*
Galvanized .....	.....	.....	.....	.....	.....	5.50	.....	.....	.....
Strip									
Hot-rolled									
Over 8-in.	3.60	3.60	3.60	.....	3.60	3.60	3.60	3.60	.....
6-in. & under	3.70	3.70	3.70	.....	3.70	3.70	3.70	3.70	.....
Cold-rolled	4.30	.....	4.30	.....	4.40	.....	4.30	4.30	5.00*
Commodity .....	.....	.....	.....	.....	.....	.....	4.45	.....	.....
Shapes .....	.....	3.45	.....	.....	3.45	3.45	3.45	3.45	.....
Beams .....	.....	3.45	.....	.....	.....	3.45	.....	.....	.....
Bars									
Hot-rolled	3.70	3.70	3.70	.....	.....	3.70	3.70	3.732††	.....
Cold-rolled .....	.....	.....	.....	.....	.....	.....	.....	4.382††	.....
Bar shapes .....	.....	3.85	.....	.....	3.85	3.85	3.85	3.85	.....
Billets, blooms, slabs (per gross ton)									
Structural .....	.....	.....	.....	.....	.....	.....	.....	\$74.65†	.....
Forging .....	.....	.....	.....	.....	.....	.....	.....	\$82.23†	.....

* 21 gage and lighter. heat treating grade.

† Alloy extras apply.

† Add 0.379¢ for forging or

WELDED PIPE AND TUBING

Base discounts, f.o.b. Pittsburgh district and Lorain, Ohio, mills

(F.o.b. Pittsburgh only on wrought pipe)
Base price—\$200.00 per net ton

Steel (buttweld)

	Black	Galv.
1/2-in.	60 1/2	48
3/4-in.	63 1/2	52
1-in. to 3-in.	65 1/2	54 1/2

Wrought Iron (buttweld)

1/2-in.	17 1/2	+4 1/2
3/4-in.	24 1/2	2 1/2
1-in. and 1 1/4-in.	28 1/2	9 1/2
1 1/2-in.	33	11 1/2
2-in.	32 1/2	11 1/2

Steel (lapweld)

2-in.	58	46 1/2
2 1/2-in. and 3-in.	61	49 1/2
3 1/2-in. to 6-in.	63	51 1/2

Wrought Iron (lapweld)

2-in.	24 1/2	4 1/2
2 1/2-in. to 3 1/2-in.	25 1/2	7 1/2
4-in.	28 1/2	11 1/2
4 1/2-in. to 8-in.	27	10 1/2

Steel (butt, extra strong, plain ends)

1/2-in.	58 1/2	47 1/2
3/4-in.	62 1/2	51 1/2
1-in. to 3-in.	64	54

Wrought Iron (same as above)

1/2-in.	18 1/2	+1 1/2
3/4-in.	25 1/2	4 1/2
1-in. to 2-in.	33	13

Steel (lap, extra strong, plain ends)

2-in.	56	45 1/2
2 1/2-in. and 3-in.	60	49 1/2
3 1/2-in. to 6-in.	63 1/2	53

Wrought Iron (same as above)

2-in.	28 1/2	8 1/2
2 1/2-in. to 4-in.	34	16 1/2
4 1/2-in. to 6-in.	32 1/2	14 1/2

On buttweld and lapweld steel pipe jobbers are granted a discount of 5 pct. On l.c.l. shipments prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lapweld and one point lower discount, or \$2 a ton higher on all buttweld.

BOILER TUBES

Seamless steel and lapweld commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft f.o.b. Pittsburgh, in carload lots

	Seamless	Lap-weld, Cold-Drawn	Hot-Rolled
2 in. O.D. 13 B.W.G.	16.52	13.90	13.20
2 1/2 in. O.D. 12 B.W.G.	22.21	18.70	17.67
3 in. O.D. 12 B.W.G.	24.71	20.79	19.56
3 1/2 in. O.D. 11 B.W.G.	31.18	26.25	24.68
4 in. O.D. 10 B.W.G.	38.68	32.56	30.55

(Extras for less carload quantities)
40,000 lb or ft and over.....Base
30,000 lb or ft to 39,999 lb or ft.....5 pct
20,000 lb or ft to 29,999 lb or ft.....10 pct
10,000 lb or ft to 19,999 lb or ft.....20 pct
5,000 lb or ft to 9,999 lb or ft.....30 pct
2,000 lb or ft to 4,999 lb or ft.....45 pct
Under 2,000 lb or ft.....65 pct

CAST IRON WATER PIPE

	Per net ton
6-in. to 24-in., del'd Chicago.....	\$70.33
6-in. to 24-in., del'd New York.....	69.60
6-in. to 24-in., Birmingham.....	61.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles or Seattle for all rail shipment; rail and water shipment less.....	84.40
Class "A" and gas pipe, \$5 extra; 4-in. pipe is \$5 a ton above 6-in.	

BOLTS, NUTS, RIVETS, SET SCREWS

An increase of 12 pct applies to listings except Large Rivets

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

	Base discount less case lots	Percent Off List
1/2 in. & smaller x 6 in. & shorter.....	65 1/2	
9/16 & 5/8 in. x 6 in. & shorter.....	63 1/2	
3/4 to 1 in. x 6 in. & shorter.....	61	
1 1/4 in. and larger, all lengths.....	59	
All diameters over 6 in. long.....	59	
Lag. all sizes.....	62	
Flow bolts.....	65	

Nuts, Cold Punched or Hot Pressed

	(Hexagon or Square)
1/2 in. and smaller.....	62
9/16 to 1 in. inclusive.....	59
1 1/4 to 1 1/2 in. inclusive.....	57
1 1/2 in. and larger.....	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts U.S.S. S.A.E.

	Base discount less keg lots
7/16 in. and smaller.....	64
1/2 in. and smaller.....	62
1/2 in. through 1 in.....	60
9/16 in. through 1 in.....	59
1 1/4 in. through 1 1/2 in.....	57
1 1/2 in. and larger.....	56

In full keg lots, 10 pct additional discount. For 200 lb or more, freight allowed up to 50¢ per 100 lb, based on Cleveland, Chicago, Pittsburgh.

Stove Bolts

	Consumer
Packages, nuts loose.....	71 and 10
In packages.....	71
In bulk.....	80

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets

	(1/2 in. and larger)	Base per 100 Lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham.....		\$4.75
F.o.b. Lebanon, Pa.		4.90

Small Rivets

	(7/16 in. and smaller)	Percent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham.....		65 and 5

Cap and Set Screws

	Percent Off List	Consumer
(In packages)		
Upset full fin, hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.....	64	
Upset set screws, cup and oval points	71	
Milled studs.....	46	
Flat head cap screws, listed sizes.....	36	
Fillister head cap, listed sizes.....	51	
Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.		

FLUORSPAR

Maximum price f.o.b. consumer's plant, \$30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

	Base price per short ton
Effective CaF ₂ Content:	
70% or more.....	\$33.00
65% but less than 70%.....	32.00
60% but less than 65%.....	31.00
Less than 60%.....	30.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer.....	\$5.45
Old range, non-bessemer.....	5.30
Mesaba, bessemer.....	5.20
Mesaba, non-bessemer.....	5.05
High phosphorus.....	5.05

Prices are for ore shipped on and after June 24, 1946, and for ore covered by adjustable pricing agreements authorized by Order No. 8, RMPR 113.

These prices do not reflect the recent ICC increase in freight rates.

METAL POWDERS

Prices in cents per pound in ton lots, f.o.b. shipping point.

Brass, minus 100 mesh.....	19 1/4¢ to 21 1/4¢
Copper, electrolytic, 100 and 375 mesh.....	23 1/4¢ to 27 1/4¢
Copper, reduced, 150 and 200 mesh.....	22 1/4¢
Iron, commercial, 100, 200, 325, mesh 96 + % Fe.....	11¢ to 16¢
Swedish sponge iron, 100 mesh, c.l.f. N. Y., carlots, ocean bags.....	7.4¢ to 8¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots.....	4¢
Iron, hydrogen reduced, 300 mesh and finer, 98 + % Fe, drum lots.....	63¢
Iron, electrolytic, unannealed, 325 mesh and coarser, 99 + % Fe.....	25¢ to 31¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe.....	17¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe.....	90¢ to \$1.75
Aluminum, 100, 200 mesh, carlots.....	25¢
Antimony, 100 mesh.....	30¢
Cadmium, 100 mesh.....	\$1.75
Chromium, 100 mesh and finer.....	\$1.25
Lead, 100, 200 & 300 mesh.....	13 1/4¢ to 16¢
Manganese, minus 325 mesh and coarser.....	44¢ to 61¢
Nickel, 150 mesh.....	51 1/4¢
Silicon, minus 325 mesh and coarser.....	26¢ to 55¢
Solder powder, 100 mesh.....	8 1/4¢ plus metal
Tin, 100 mesh.....	58 1/4¢
Tungsten metal powder, 98%.....	
99%, any quantity, per lb.....	\$2.60
Molybdenum powder, 99%, in 100-lb kegs, f.o.b. York, Pa., per lb.....	\$2.65
Under 100 lb.....	\$2.90

COKE

	Net Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	\$8.75
Connellsville, Pa., hand drawn.....	9.35
Foundry, beehive (f.o.b. oven)	
Fayette Co., W. Va.	8.10
Connellsville, Pa.	8.50
Foundry, Byproduct	
Chicago, del'd.....	15.10
Chicago, f.o.b.....	14.35
New England, del'd.....	16.04
Kearny, N. J., f.o.b.....	14.40
Philadelphia, del'd.....	14.63
Buffalo, del'd.....	14.75
Portsmouth, Ohio, f.o.b.....	12.85
Painesville, Ohio, f.o.b.....	13.50
Erie, del'd.....	14.50
Cleveland, del'd.....	14.55
Cincinnati, del'd.....	14.60
St. Louis, del'd.....	15.10†
Birmingham, del'd.....	12.25

†Except producers situated in states other than Missouri, Alabama or Tennessee, sellers may charge a maximum delivered price of \$15.60 in the St. Louis Mo., and East St. Louis, Ill., switching districts.

REFRACTORIES

(F.o.b. Works)

	Per 1000
Super-duty brick, St. Louis.....	\$76.05
First quality, Pa., Md., Ky., Mo., Ill., Ohio.....	60.40
First quality, New Jersey.....	65.90
Sec. quality, Pa., Md., Ky., Mo., Ill.....	54.80
Sec. quality, New Jersey.....	57.70
Sec. quality, Ohio.....	52.95
Ground fire clay, net ton, bulk.....	8.95

Silica Brick

	Per Net Ton
Pennsylvania and Birmingham.....	\$60.40
Chicago District.....	69.30
Silica cement, net ton (Eastern).....	10.60

Chrome Brick

	Per Net Ton
Standard chemically bonded, Balt., Plymouth Meeting, Chester.....	\$54.00

Magnesite Brick

	Per Net Ton
Standard, Balt. and Chester.....	\$76.00
Chemically bonded, Baltimore.....	65.00

Grain Magnesite

	Per Net Ton
Domestic, f.o.b. Balt. and Chester in sacks.....	\$44.50
Domestic, f.o.b. Chewelah, Wash., in bulk.....	22.00
in sacks.....	26.00
Clinker (dead burned) dolomite, per ton East, \$9.30; Midwest, add 10¢; Mo. Valley, add 20¢.	

PRICES

WAREHOUSE PRICES

Delivered metropolitan areas, per 100 lb.

Cities	SHEETS			STRIP			Plates 1/4 in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot- Rolled (10 gage)	Cold- Rolled	Galvanized (24 gage)	Hot-Rolled 8 in. and Under	Hot-Rolled Over 8 in.	Cold- Rolled			Hot- Rolled	Cold- Finished	Hot- Rolled, A-8617-20	Hot- Rolled, A-8742-50 Ann.	Cold- Drawn, A-8617-20	Cold- Drawn, A-8742-50 Ann.
**Philadelphia.....	\$3.774	\$5.139	\$5.249*	\$4.314	\$4.214	\$5.064	\$3.875	\$3.937	\$4.114	\$4.564	\$6.237	\$7.387	\$7.664	\$8.764
New York.....	3.856	4.869	5.501	4.375	4.275	5.075	4.049	4.038	4.134	4.584	6.338	7.438	7.684	8.784
Boston.....	4.05	5.031	5.725	4.518	4.418	4.985	4.203	4.023	4.356	4.856	6.503	7.603	7.756	8.856
Baltimore.....	3.64	5.118	5.385	4.293	4.193	5.000	3.865	4.05	4.083	4.543	6.237	7.387	7.664	8.764
Norfolk.....	4.037	5.118	5.862	4.577	4.477	5.000	4.262	4.303	4.377	4.877	6.237	7.387	7.664	8.764
Chicago.....	3.833	4.583	5.558	4.108	4.008	5.058*	3.958	3.958	3.908	4.358	6.308	7.408	7.458	8.558
Milwaukee.....	3.575	4.583	5.347	3.95	3.85	5.000	3.65	3.88	3.60	4.20	6.277	7.377	7.20	8.30
Cleveland.....	3.575	4.625	5.20	4.211	4.111	4.961	3.921	3.65	3.60	4.20	6.05	7.15	7.20	8.30
Buffalo.....	3.675	4.725	5.491	4.05	3.95	5.000	3.900	3.952	3.70	4.25	6.421	7.521	7.55	8.65
Detroit.....	3.671	4.721	5.296	4.046	3.946	5.002	3.952	3.983	3.902	4.502	6.441	7.541	7.602	8.702
Cincinnati.....	3.643	4.593	5.622	4.118	4.018	5.222	3.968	3.968	3.918	4.522	6.472	7.572	7.622	8.722
St. Louis.....	3.575	4.625	5.347	3.95	3.85	5.000	3.65	3.85	3.60	4.20	6.05	7.15	7.20	8.30
Pittsburgh.....	3.817	4.767	5.666	4.292	4.192	5.000	4.142	4.142	4.092	4.852	6.472	7.572	7.622	8.722
St. Paul.....	3.817	4.767	5.666	4.292	4.192	5.000	4.142	4.142	4.092	4.852	6.472	7.572	7.622	8.722
Duluth.....	4.045	5.72	6.00	4.52	4.42	5.000	4.37	4.37	4.32	4.845	6.472	7.572	7.622	8.722
Omaha.....	3.775	4.825	5.40	4.15	4.05	5.03	3.92	3.92	3.87	4.47	6.17	7.27	7.32	8.42
Indianapolis.....	3.675	4.825	5.20	4.05	3.95	5.000	3.80	3.80	3.75	4.954	6.414	7.514	7.564	8.664
Birmingham.....	4.221	5.746	6.00	4.596	4.496	5.000	4.346	4.346	4.296	4.821	6.414	7.514	7.564	8.664
Memphis.....	4.324*	5.365*	5.849	4.699	4.599	5.000	4.449	4.449*	4.399*	5.14	6.414	7.514	7.564	8.664
New Orleans.....	4.85	6.601	6.85	5.30	5.20	5.000	4.80	4.70	4.65	5.14	6.414	7.514	7.564	8.664
Los Angeles.....	4.85	6.601	6.85	5.30	5.20	5.000	4.80	4.70	4.65	5.14	6.414	7.514	7.564	8.664
San Francisco.....	4.40	6.00	6.55	4.85	4.75	5.000	4.50	4.35	4.40	5.78	6.23	7.33	7.38	8.48
Seattle.....	4.875	7.272	6.40	4.60	4.50	5.000	5.005	4.705	4.605	6.23	7.705	8.805	8.85	9.955
Portland.....	4.875	7.272	6.40	4.60	4.50	5.000	5.005	4.705	4.605	6.23	7.705	8.805	8.85	9.955
Salt Lake City.....	4.81	6.70	6.70	5.84	5.84	5.000	5.29	5.29	5.19	6.49	7.70	8.85	8.85	9.955

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.**COLD-ROLLED:** Sheets, 400 to 1999 lb; strip, extras on all quantities; bars, 1500 lb base.**ALLOY BARS:** 1000 to 39,999 lb.**GALVANIZED SHEETS:** 450 to 1499 lb.**EXCEPTIONS:** (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 450 to 3749 lb; (4) 300 to 4999 lb; (5) 300 to 10,000 lb; (6) 2000 lb and over; (7) 3500 lb and over; (8) 1000 lb and over.

(*) Philadelphia: Galvanized sheet, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

* Add 29.1¢ for sizes not rolled in Birmingham.

** City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

PIG IRON PRICES

Per gross ton, retroactive to May 29.

BASING POINT PRICES						DELIVERED PRICES (BASE GRADES)							
Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem.....	29.00	29.50	30.00	30.50	.....	Boston.....	Everett.....	\$0.50 Arb.	29.50	30.00	30.50	31.00	.....
Birdsboro.....	29.00	29.50	30.00	30.50	34.00	Boston.....	Birdsboro-Steelton...	4.47	.....	.....	.....	.....	38.47
Birmingham.....	23.50*	24.88*	.....	29.50	.....	Brooklyn.....	Bethlehem.....	2.78	31.78	32.28	32.78	33.28	.....
Buffalo.....	27.50	28.50	29.00	29.50	34.00	Brooklyn.....	Birdsboro.....	3.26	.....	.....	.....	.....	37.26
Chicago.....	28.00	28.50	29.00	29.50	.....	Canton.....	Clev. Ygsn, Sharpvil.	1.54	29.54	30.04	30.04	30.54	.....
Cleveland.....	28.00	28.50	28.50	29.00	.....	Canton.....	Buffalo.....	3.55	.....	.....	.....	.....	37.55
Detroit.....	28.00	28.50	28.50	29.00	.....	Cincinnati.....	Birmingham.....	4.30	27.80*	29.18*	.....	.....	.....
Duluth.....	28.50	29.00	29.00	29.50	.....	Cincinnati.....	Hamilton.....	1.24	.....	.....	29.74	.....	.....
Erie.....	28.00	28.50	29.00	29.50	.....	Cincinnati.....	Buffalo.....	4.89	.....	.....	.....	.....	38.89
Everett.....	29.00	29.50	30.00	30.50	.....	Jersey City.....	Bethlehem.....	1.70	30.70	31.20	31.70	32.20	.....
Granite City.....	28.00	28.50	28.50	29.00	.....	Jersey City.....	Birdsboro.....	2.16	.....	.....	.....	.....	38.16
Hamilton.....	28.00	28.50	28.50	29.00	.....	Los Angeles.....	Provo.....	5.25	31.25	31.75	.....	.....	.....
Neville Island.....	28.00	28.50	28.50	29.00	.....	Los Angeles.....	Buffalo.....	16.33	.....	.....	.....	.....	50.33
Provo.....	28.00	28.50	.....	.....	.....	Mansfield.....	Cleveland-Toledo.....	2.16	30.16	30.66	30.66	31.16	.....
Sharpsville.....	28.00	28.50	28.50	29.00	.....	Mansfield.....	Buffalo.....	3.74	.....	.....	.....	.....	37.74
Sparrows Point.....	29.00	29.50	.....	.....	.....	Philadelphia.....	Swedeland.....	0.93	29.93	30.43	30.93	31.43	.....
Steelton.....	29.00	.....	.....	.....	34.00	Philadelphia.....	Birdsboro.....	1.38	.....	.....	.....	.....	35.38
Swedeland.....	29.00	29.50	30.00	30.50	.....	San Francisco.....	Provo.....	5.25	31.25	31.75	.....	.....	.....
Toledo.....	28.00	28.50	28.50	29.00	.....	San Francisco.....	Buffalo.....	16.33	.....	.....	.....	.....	50.33
Youngstown ¹	28.00	28.50	28.50	29.00	.....	Seattle.....	Provo.....	5.25	31.25	31.75	.....	.....	.....
						Seattle.....	Buffalo.....	16.33	.....	.....	.....	.....	50.33
						St. Louis.....	Granite City.....	0.50 Arb.	28.50	29.00	29.00	29.50	.....
						St. Louis.....	Buffalo.....	7.88	.....	.....	.....	.....	41.88

* Republic Steel Corp. has been granted a \$2 increase on basic and foundry pig iron produced at Birmingham.

(1) Struthers Iron & Steel Co., Struthers, Ohio, may charge 50¢ per ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Charcoal pig iron base prices for Lyles, Tenn., and Lake Superior furnaces, \$33.00 and \$34.00, respectively. Newberry Brand of Lake Superior charcoal iron \$39.00 per g.t., f.o.b. furnace. Delivered to Chicago, \$42.34.

High phosphorus iron sells at Lyles, Tenn., at \$28.50.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each

0.50 pct manganese content in excess of 1.00 pct. \$2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and \$1 per ton extra for each additional 0.25 pct nickel.

Silvery iron, silicon 6.00 to 6.50 pct, C/I per g.t., f.o.b. Jackson, Ohio—\$34.00; f.o.b. Buffalo—\$35.25. Add \$1.00 per ton for each additional 0.50 pct Si. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add \$1.00 per ton for prices of comparable analysis.

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.

Carload lots (bulk)	\$135.00
Less ton lots (packed)	148.50
F.o.b. Pittsburgh	139.50
\$1.70 for each 1% above 82% Mn; penalty, \$1.70 for each 1% below 78%.	
Briquets—cents per pound of briquet, freight allowed, 66% contained Mn.	
Eastern Central Western	
Carload, bulk	6.05 6.30 6.60
Ton lots	6.65 7.55 8.55
Less ton lots	6.80 7.80 8.80

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn	19-21% Mn
	3% max. Si	3% max. Si
Carloads	\$35.00	\$36.00
Less ton	47.50	48.50
F.o.b. Pittsburgh, Chicago	40.00	

Manganese Metal

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.	
Carload, bulk	30
L.c.l. lots	32

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	32
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.10% max. C, 0.06% P, 90% Mn	21.00	21.40	21.65
0.10% max. C	20.50	20.90	21.15
0.15% max. C	20.00	20.40	20.65
0.30% max. C	19.50	19.90	20.15
0.50% max. C	19.00	19.40	19.65
0.75% max. C			
7.00% max. Si	16.00	16.40	16.65

Silicomanganese

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed, 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.05
Ton lots	6.70
Briquet, contract basis, carlots, bulk freight allowed, per lb of briquet.	5.80
Ton lots	6.30
Less ton lots	6.55

Silvery Iron (electric furnace)

Si 14.01 to 14.50%, \$51.25 f.o.b. Keokuk, Iowa; \$48.00 f.o.b. Jackson, Ohio; \$49.25 f.o.b. Niagara Falls. Add \$1.00 per ton for each additional 0.50% Si up to and including 18%. Add \$1.00 per ton for low impurities, not to exceed: P—0.05%, S—0.04%, C—1.00%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots, packed.

	Eastern	Central	Western
96% Si, 2% Fe	13.10	13.55	16.50
97% Si, 1% Fe	13.45	13.90	16.80

Ferrosilicon Briquets

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si.

	Eastern	Central	Western
Carload, bulk	3.60	3.75	3.90
Ton lots	4.05	4.55	4.60
Less ton lots	4.45	4.80	4.85

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
50% Si	7.05	7.50	7.65
75% Si	8.55	8.70	9.25
80-90% Si	9.50	9.65	10.15
90-95% Si	11.80	11.95	12.40

Ferrochrome

(65-72% Cr, 2% max. Si)
Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C	23.00	23.40	24.00
0.10% C	22.50	22.90	23.50
0.15% C	22.00	22.40	23.00
0.20% C	21.50	21.90	22.50
0.50% C	21.00	21.40	22.00
1.00% C	20.50	20.90	21.50
2.00% C	19.50	19.90	20.50
66-71% Cr, 4-10% C	14.50	14.90	15.00
62-66% Cr, 5-7% C	15.05	15.45	15.55

Briquets—contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.

	Eastern	Central	Western
Carload, bulk	9.20	9.50	9.90
Ton lots	9.80	10.30	11.80
Less ton lots	10.10	10.60	12.10

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low-carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N. High-carbon type: 66.71% Cr, 4-5% C, 0.75% N. Add 5¢ per lb to regular high-carbon ferrochrome price schedule.

S. M. Ferrochromes

Contract price, cents per pound chromium contained, lump size, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

	Eastern	Central	Western
Carload	15.60	16.00	16.10
Ton lots	16.65	17.30	18.50
Less ton lots	17.30	17.95	19.15

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

	Eastern	Central	Western
Carload	20.00	20.40	21.00
Ton lots	21.00	21.65	22.85
Less ton lots	22.00	22.65	23.85

Chromium Metal

Contract prices, cents per lb, chromium contained, carload, f.o.b. shipping point, freight allowed. 97% min. Cr, 1% max. Fe.

	Eastern	Central	Western
0.20% max. C	83.50	85.00	86.25
0.50% max. C	79.50	81.00	82.25
9.00% min. C	79.50	81.00	82.25

Chromium—Copper

Contract price, cents per pound of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi. 8-11% Cr, 88-90% Cu, 1.00% max. Fe, 0.50% max. Si.

Shot or ingot

45¢

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed. 30-35% Ca, 60-65% Si, 3.00% max. Fe or 28-32% Ca, 60-65% Si, 6.00% max. Fe.

	Eastern	Central	Western
Carloads	13.00	13.50	15.55
Ton lots	14.50	15.25	17.40
Less ton lots	15.50	16.25	18.40

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.

	Eastern	Central	Western
Carloads	15.50	16.00	18.05
Ton lots	16.50	17.35	19.10
Less ton lots	17.00	17.85	19.60

Calcium Metal

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1¢ for central zone; 5¢ for western zone.

	Cast	Turnings	Distilled
Ton lots	\$1.35	\$1.75	\$4.25
Less ton lots	1.60	2.00	5.00

CMSSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

	Eastern	Central	Western
Ton lots	12.00	12.75	14.75
Less ton lots	12.50	13.25	15.25

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

	Eastern	Central	Western
Ton lots	11.75	12.50	14.50
Less ton lots	12.25	13.00	15.00

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe.

	Eastern	Central	Western
Ton lots	12.00	12.85	14.60
Less ton lots	12.50	13.35	15.10

Other Ferroalloys

Ferrotungsten, standard, lump or ¼X down, packed, f.o.b. plant Niagara Falls, Washington, Pa., York, Pa., per pound contained

T, 5 ton lots, freight allowed

\$1.88

Ferrovanadium, 35-55%, contract basis, f.o.b. plant, freight allowed, per pound contained V.

Openhearth

\$2.70

Crucible

\$2.80

High speed steel (Primos)

\$2.90

Vanadium pentoxide, 88-92% V₂O₅ technical grade, contract basis, per pound contained V₂O₅.

\$1.10

Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb.

Ton lots

\$2.25

Less ton lots

\$2.30

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo

95¢

Calcium molybdate, 40-45%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo

80¢

Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo

80¢

Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo

80¢

Ferrotitanium, 40-45%, 0.10% C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti

\$1.23

Less ton lots

\$1.25

Ferrotitanium, 20-25%, 0.10% C max., ton lots, per pound contained Ti

\$1.35

Less ton lots

\$1.40

High-carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads

\$142.50

Ferrophosphorus, 18%, electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with \$3 unitage freight equalled with Rockdale, Tenn., per gross ton

\$58.50

Ferrophosphorus, Electrolytic, 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., \$3 unitage freight equalled with Nashville, per gross ton

\$75.00

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy

14¢

Carload lots

14¢

Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy

4.60¢

Carload, bulk

5.75¢

Alsilfer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Niagara Falls, carload

7.25¢

Ton lots

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound

Car lots

8.00¢

Ton lots

8.75¢

Less ton lots

9.25¢

Less ton lots

9.25¢

Less ton lots

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Less ton lots

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9.25¢

Sees Atomic Power Possible at a Cost Of Only 0.8¢ a Kw-hr

Chicago

••• In an address to the American Chemical Society Convention here, Dr. Charles A. Thomas, vice-president of Monsanto Chemical Co., declared that atomic power for peacetime industrial use can be produced at a cost roughly comparable to coal power cost.

Dr. Thomas opened his address to the convention with a description of the "fantastic density" of an atomic nucleus and stated, "This density of an atomic nucleus is unimaginable. If one could get one cc of the stuff nuclei are made of, it would weigh 100 million tons." Dr. Thomas continued, "Equally fantastic as the density of the nucleus is the binding, or attractive forces with which the particles are held together. For example, if a piano wire held together with the same force that binds the particles in a nucleus, such a wire could hold the entire prewar U. S. Navy dangling at its end."

In revealing the details of an atomic power cost survey prepared for the United Nations atomic energy committee, the speaker disclosed that the survey showed an atomic power plant of 75,000 kw could be built in the eastern United States for approximately \$25 million, and added: "On the assumption that the plant would operate at 100 pct capacity and that interest charges on the investment would be 3 pct, the plant could produce power at approximately 0.8¢ per kw-hr." A coal power plant would cost \$10 million under the same conditions, he said, and added bituminous coal could be delivered to this plant in the eastern United States at about \$7 per ton. He concluded, "The cost of producing power in this plant would be approximately 0.65¢ per kw-hr. Equality of operating costs between coal power plants and nuclear power plants would be reached if the coal cost were \$10 per ton."

Coal constitutes about 60 pct of the total operating cost of a conventional power plant and Dr. Thomas pointed out that there are signs of further rise in operating costs of such plants. Lower costs for atomic power



and engineering know-how looks for new worlds to conquer in developing industrial PRECISION CASTING EQUIPMENT

Always in the development of a new technique an endless chain of problems has to be met and solved. Out of the experience gained from 40 years in improving facilities and developing specialized equipment and materials for the making of precision castings for the dental profession Kerr engineers made tremendous strides — improving qualities and attaining amazing accuracies on the most difficult and intricate of castings.

All units of Kerr specialized equipment and materials developed for the precision casting industry embody the results of the highest engineering research — designed to make available the almost limitless advantages of precision casting methods.

KERR RESEARCH ENGINEERS ARE READY TO GO TO WORK FOR YOU

We will engineer a complete set-up for the efficient production of precision castings to meet your individual requirements. The entire facilities and experience of the Kerr Engineering and Research Laboratories are at your service. Feel free to call on us.

Write for booklets "Fundamentals of Industrial Precision Casting" and "Equipment and Materials."



KERR MANUFACTURING COMPANY

6081 TWELFTH STREET • DETROIT 8, MICHIGAN

"AFTER 14 YEARS OF SERVICE OUR

Baker Truck NEEDS NO

NEW PARTS!"



"Your letter of December 29 was received with relation to our Baker Truck. Our superintendent tells us that surprising as it may seem, no new parts are necessary. Your representative told him what adjustments could be made, and it seems that they could do it all right there at the cannery. It looks like this is just one more blue ribbon for the Baker Truck, because it is amazing that after all these years of service a general replacement of essential parts is unnecessary. It is certainly very gratifying to us."

—And gratifying to us, too! Letters like the above, from a food processing plant, prove two things: first, that the sturdy construction and high standards of Baker engineering design mean dependable service and long life; second, that proper industrial truck care pays the user big dividends in continuous operation and low maintenance.

The truck in question was purchased in 1931. The original investment has long since been written off—paid for in a short time by actual savings in handling costs and more efficient use of warehouse space. The owner has enjoyed 14 years of trouble-free service—possible only with electric trucks, which also mean quiet, smooth operation, lowest power costs and maximum safety.

• • •

Your Baker representative can show you how these advantages of electric-powered industrial trucks will apply to your handling problems. If you don't already know him, write us direct.

BAKER INDUSTRIAL TRUCK DIVISION

of The Baker-Raulang Company

2175 West 25th Street

Cleveland, Ohio

In Canada: Railway and Power Engineering Corporation, Limited



Member: Electric Industrial Truck Association

Baker INDUSTRIAL TRUCKS

NEWS OF INDUSTRY

plants, he said, are dependent on the successful solution of numerous technical, operating, maintenance and labor costs. "However," he said, "it seems reasonable to expect that the future development of nuclear power will result in the standardization of design and construction and a material reduction in the investment and operating costs."

Three broad applications for atomic power were outlined by Dr. Thomas. First, "Nuclear power plants would make feasible a greater decentralization of industry, a desirable factor in the world economy." Second, "The nuclear power plant will aid in the industrial development of isolated parts of the world where the cost of oil, gas or coal is prohibitive and where a supply of water is unavailable." Third, "The nuclear power plant, in connection with the modern gas turbine, might be desirable as operating or standby plants to existing large utilities. Unlike hydroelectric power plants, nuclear power plants can supply process and heating steam directly in addition to power."

The study of atomic power plant cost, Dr. Thomas said, was made by members of the Monsanto Clinton Laboratory staff at Oak Ridge, Tenn., at the request of Bernard Baruch, United States representative to the United Nations Atomic Energy Committee, and his committee. As technical director for Monsanto, Dr. Thomas supervises these laboratories which are operated under government contract. According to the speaker, the first atomic power plant will probably be along conventional lines. Except for the boiler, it will resemble an ordinary steam power plant. The turbines, electric generators, and electrical transmission lines will be of conventional design, but the furnace or boiler will be replaced by a chain reacting pile.

Dr. Thomas said, "Any chain reacting pile must be very heavily shielded to protect the operators from radiations. A cooling fluid, such as water or other media, will flow through the pile to pick up the heat produced therein. Naturally, this fluid will be radioactive, since it comes in contact with a high neutron flux in the pile. Thus, it will probably be awkward to use it directly for generating

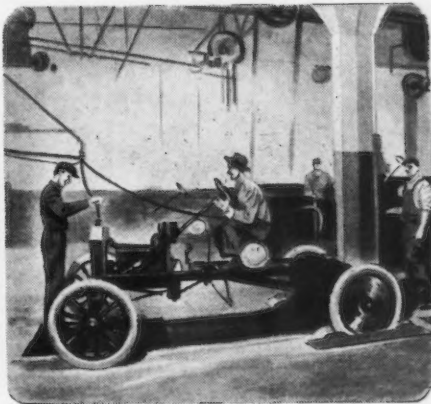
(CONTINUED ON PAGE 142)

Old Reliable Red Band Says—

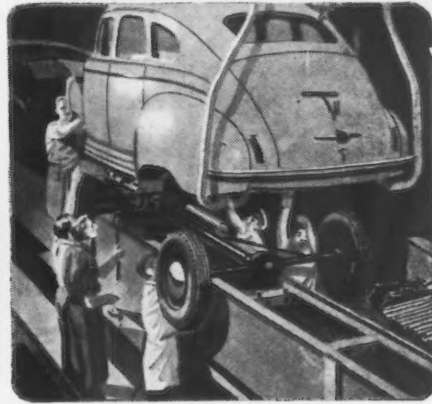
"Remember when horseless carriages were made by hand?"



1 In 1897, automobiles were put together with screw drivers and wrenches. Machine tools for the growing industry soon appeared. But parts made on these machines still had to be assembled by hand—it took a lot of "tinkering" to make them fit.



2 In 1913 came the first moving assembly line—the forerunner of modern mass production. It eliminated the back-breaking labor of carrying parts from machine to machine, then to assembly point. Now, the work, not the man, progressed from operation to operation.



3 Today, electrical horsepower not only runs all assembly lines and conveyor systems, but also operates machine tools. Since 1915, Howell has specialized in making industrial type motors for these tasks in the automotive and many other industries.

Have you a hard job for Horsepower?

For *tough* jobs, an industrial type motor is just the ticket! For 30 years, we've been building Howell industrial motors to operate under the grueling conditions found in the automotive, machine tool, food, dairy and other important industries.

Howell Motors are first choice in a score of industries because: (1) They are precision-built of the finest materials,

with copper or bronze rotors, and completely insulated.

(2) They are smooth-operating—statically and dynamically balanced. (3) They are designed for the toughest tasks in industry—consequently they perform better on *all* jobs.

See the nearest Howell Representative for your needs in specialized or standard motors up to 150 h.p. Remember, you pay no more for industrial type Howell Motors—and always get top quality for your money.



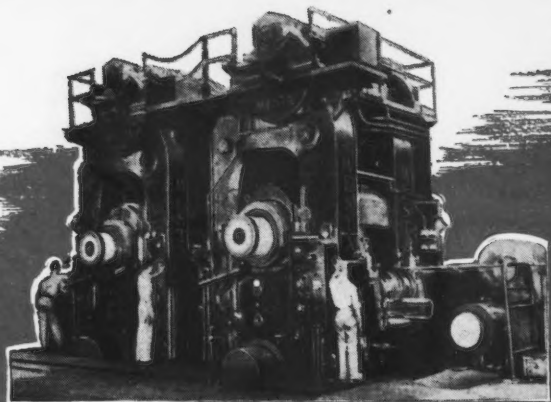
Howell Protected Type Motors available in sizes 5 h.p. and smaller. Also other sizes of Howell industrial type motors available up to 150 h.p.

HOWELL MOTORS

HOWELL ELECTRIC MOTORS CO., HOWELL, MICH.

Manufacturers of Quality Industrial Type Motors Since 1915



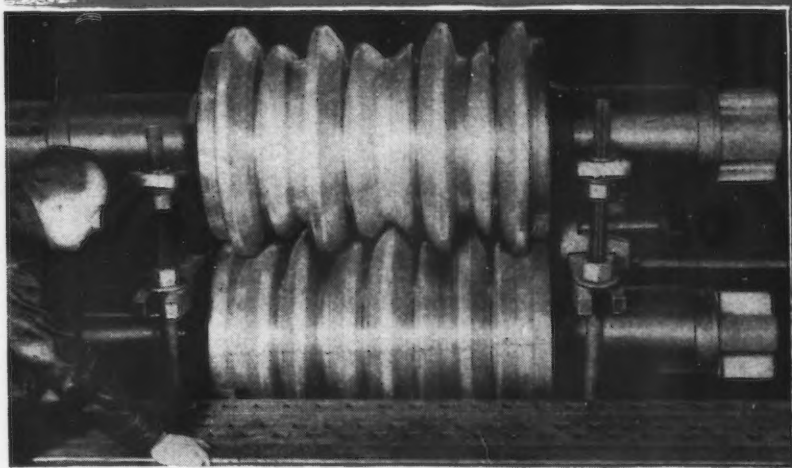


42" TWIN FOUR-HIGH SKIN PASS MILL FOR TIN PLATE

MESTA

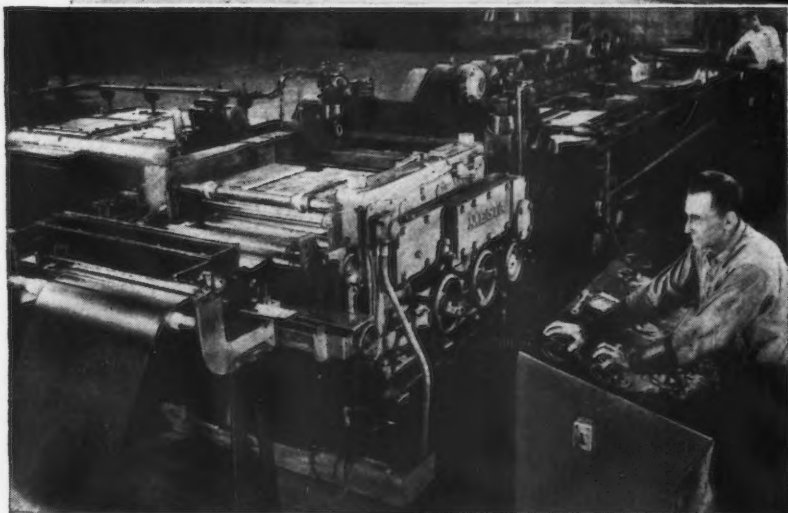
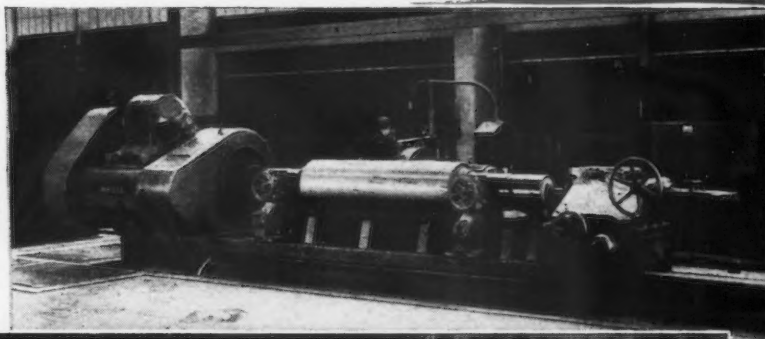
WORLD'S LEADING DESIGNERS and BUILDERS

Unequalled plant facilities, equipped with the most modern precision machinery, manned by skilled workmen with long service records, an engineering staff whose technical ability has been accumulated over many years—these resources are responsible for Mesta's leadership in the design and production of the largest heavy duty steel mill equipment, the size of which is limited only by the carrier transportation facilities.



MESTA MERCHANT MILL ROLLS FOR ROLLING I-BEAMS

MESTA 60" HEAVY DUTY ROLL GRINDER

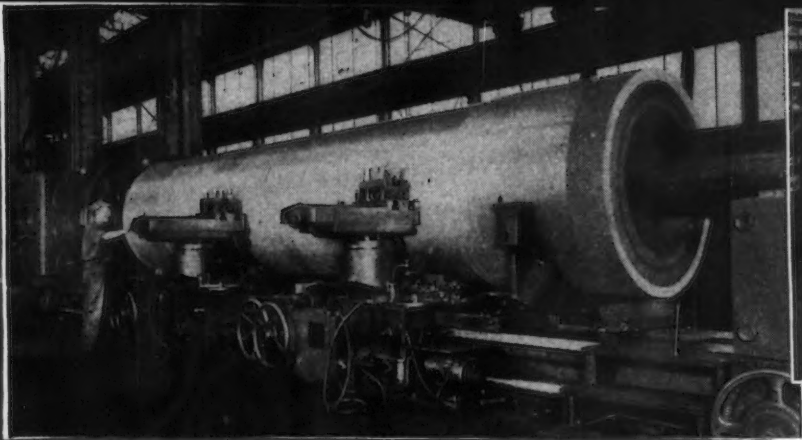


MESTA 42" TIN SHEARING LINE, SHOWING MESTA PATENTED FLYING SHEAR AND LEVELLER WITH CLASSIFYING AND PILING EQUIPMENT IN BACKGROUND

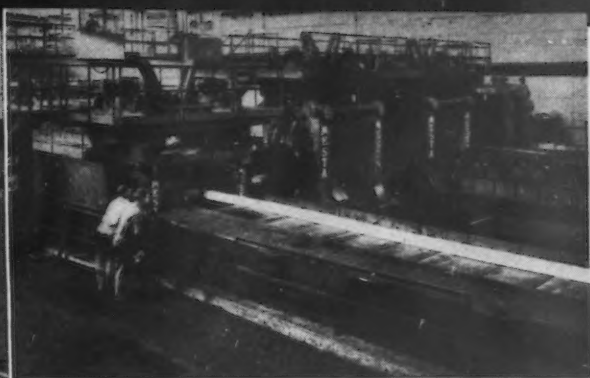


MESTA 18"—14"—10" MERCHANT WITH PACK ANNEALING COOLING

MESTA MAN



MACHINING FORGED STEEL PRESSURE VESSEL FOR
MESTA 18,000 TON HYDRAULIC PRESS

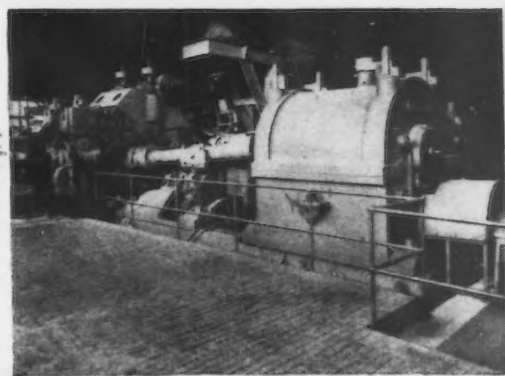


MESTA 29" STRUCTURAL MILL WITH
TRAVELING TILTING TABLE

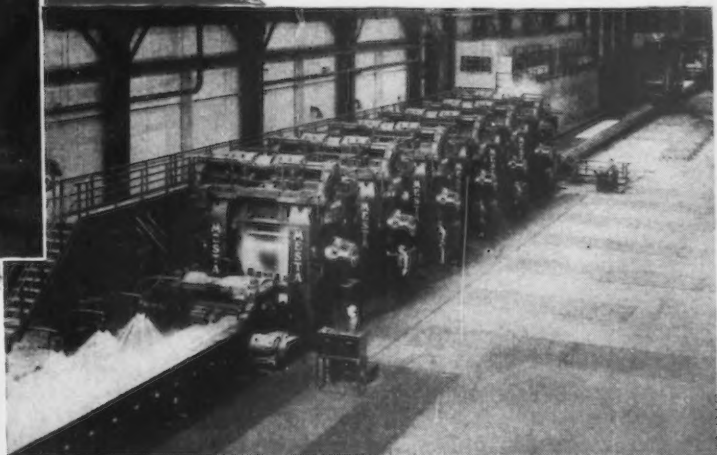
COMPLETE STEEL PLANTS



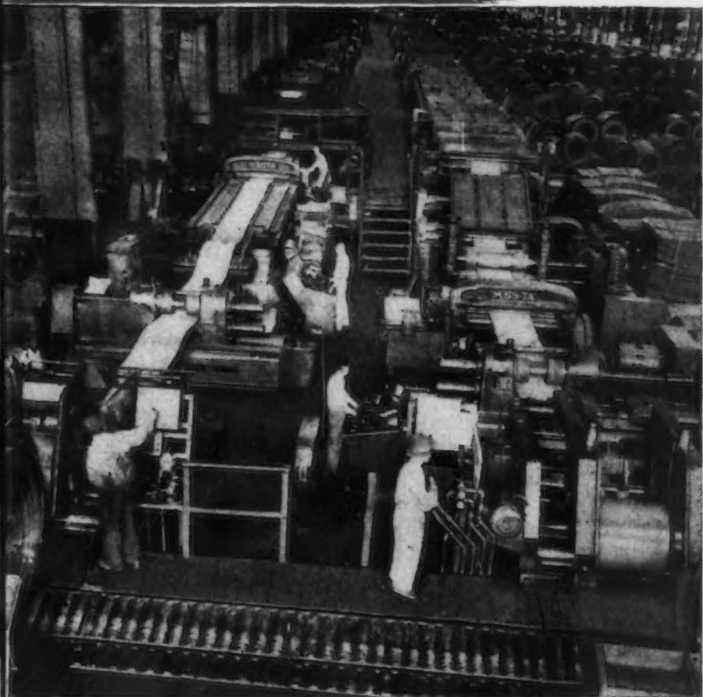
DISCHARGE END OF MESTA 42" CONTINUOUS
ELECTROLYTIC TIN PLATING LINE



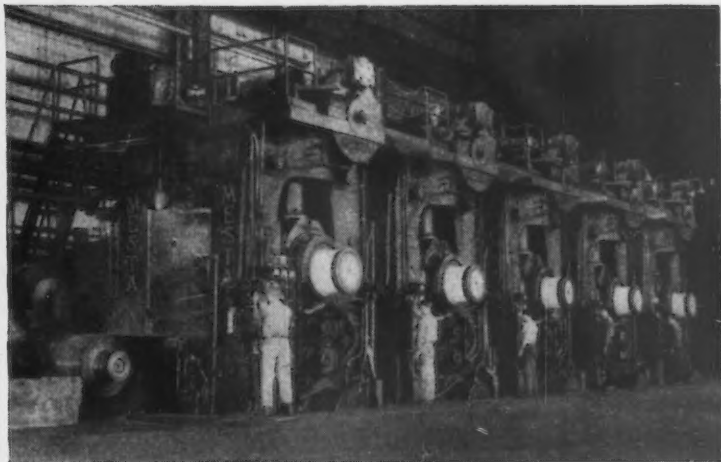
MESTA PIERCING MILL AND DRIVE



MESTA 80" FOUR HIGH CONTINUOUS STRIP MILL



MESTA 66" CONTINUOUS PICKLING LINE
WITH TRIMMERS AND UPCOILERS



MESTA 42" HIGH SPEED FOUR-HIGH TANDEM
COLD MILL FOR ROLLING TIN PLATE GAUGES

MEYER COMPANY . . . PITTSBURGH, PA.

ADVENTURES OF "CRIMPY" THE BUFFALO WIRE CLOTH MAN



THIS TIME I'M MONEL

... you can see from my silvery-white color. Just about every industry uses me ... for strainers, filters, sieves, vibrator screens, dipping baskets, conveyor belts. Brother, I've got friends!

I'M ONE-THIRD COPPER

... and $\frac{2}{3}$ nickel. That gives me "oomph" (strong, tough and hard, to you). I'm much stronger than common brasses and bronzes.



SLICK & SMOOTH - THAT'S ME

See my glossy surface? It stays that way. I don't clog, either. Things just whiz through me.



MAYBE YOU CAN'T RESIST ME but I'M resistant. Rust? Poof ... I'm immune to it. Corrosion? High temperatures? Kid's stuff! Abrasion? Stress? I wear like ... MONEL!



IT'S A CINCH TO FORM & JOIN ME

Do I form easily? Say, I'm ductile. Any shape you like. What's more, I can be welded, brazed or soldered.



I COST LESS

than any corrosion-resisting wire cloth of equally high strength.



"Buffalo" Monel Wire Cloth is woven in a large range of meshes from very fine to coarse, in all standard weaves.

Buffalo WIRE WORKS CO., INC.

Manufacturer of All Kinds of Wire Cloth Since 1869

456 TERRACE

BUFFALO 2, N. Y.

NEWS OF INDUSTRY

(CONTINUED FROM PAGE 138)

electrical power in turbines or as a heating medium. It will, therefore, be necessary to use a secondary boiler in which water or gas picks up the heat from the primary transfer fluid."

At Oak Ridge, Dr. Thomas explained, many elements can be manufactured by inserting various substances into chain reactors and allowing neutrons to be absorbed in them. "Thus," he said, "the piles are literally the philosopher's stone which all chemists sought. In these piles, for example, gold can be manufactured from mercury. But there are many more valuable elements than gold today."

To increase the pool of scientific manpower in the atomic energy field, the Monsanto Clinton Laboratories will present a 1-yr training program with the approval of the Manhattan District. Approximately 35 of the nation's outstanding physicists, chemists and engineers began a course at Oak Ridge Sept. 15 and will continue their study at the laboratories until the late spring of 1947. These men will cover the general field of radio-chemistry, pile technology, theoretical and experimental nuclear physics.

Dr. Thomas concluded his address by describing the atomic energy situation as a "paradoxical predicament." He said, "Eager to extend the benefits of this new science to mankind, our path is darkened by the shadow of the destructive power of the bomb. We stand on a threshold, peering at the peaceful benefits of the release of atomic energy, but we cannot step into this full development until first things come first and until the destructive forces of the bomb can be adequately throttled for all time."

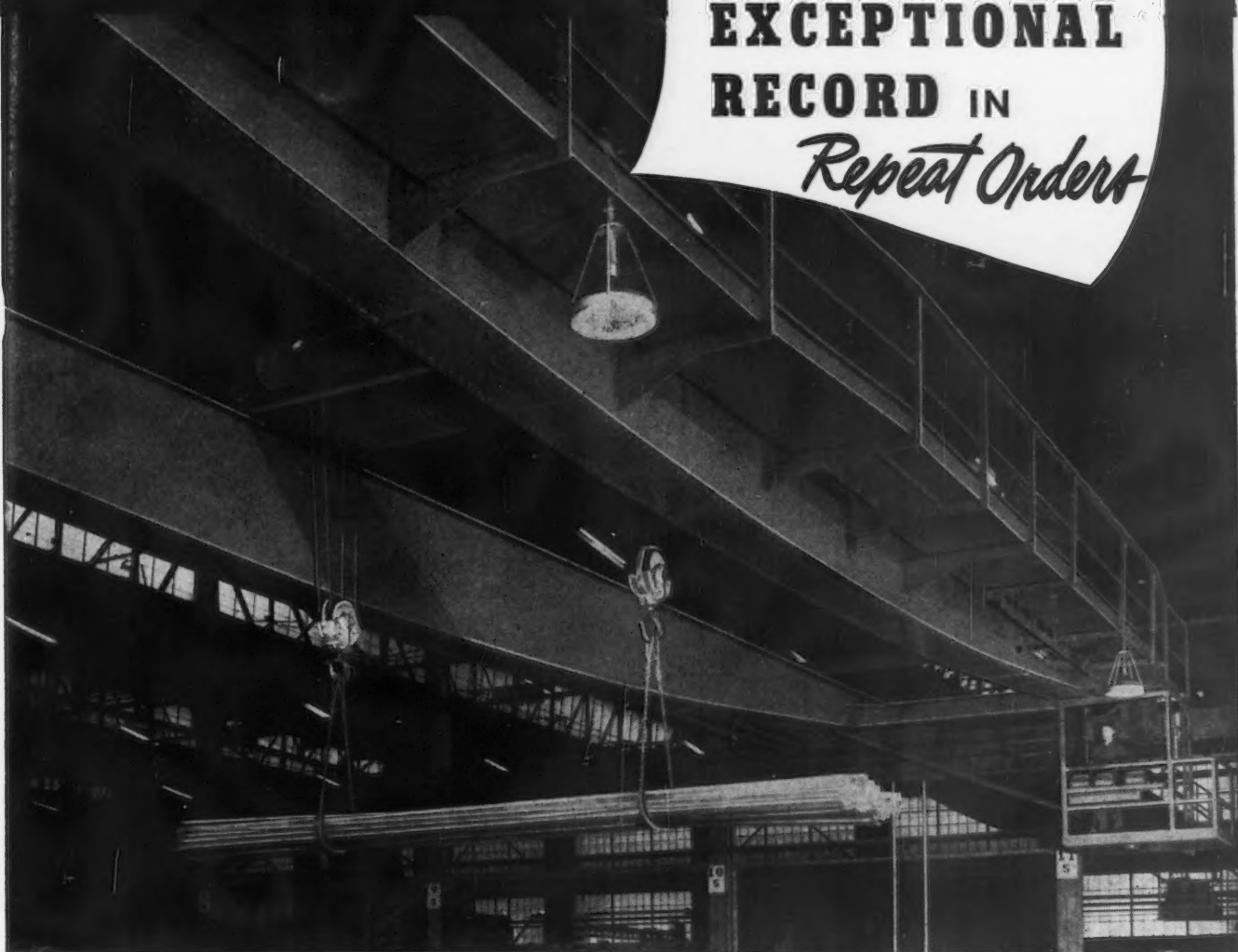
Steel Forgings Climb

Washington

• • • Shipments of steel forgings during July amounted to 154,000 short tons, an increase of 5 pct over the 147,000 tons shipped during June, according to a report released by the Bureau of the Census. Of the July shipments 80,000 tons, or 52 pct of the total, were for sale to the trade. The remaining 74,000 tons were produced for the manufacturers' own use.

CRANES

HAVE AN
**EXCEPTIONAL
RECORD** IN
Repeat Orders



Cranes are long wearing machines—do not, ordinarily, stand high in repeat business.

But Northern Cranes have built an exceptional record in repeat orders. A large proportion of our customers regard us as their prime source of cranes—reorder from us when new crane equipment is needed.

One customer has bought 645 Northern Cranes over a period of years. Many customers are regular purchasers—have large numbers in operation.

Repeat business of this sort is obtained only by the very highest quality—the type of quality built into Northern Cranes.

WRITE FOR BULLETIN

NORTHERN ENGINEERING WORKS

General Offices: 2625 ATWATER ST.
DETROIT 7, MICH.

HEAVY DUTY CRANES • LOW HEADROOM CRANES
BUCKET CRANES • TRANSFER CRANES • ELECTRIC
HOIST CRANES • HAND CRANES • ELECTRIC HOISTS
AIR HOISTS • SPECIAL CRANES AND HOISTS

Is this *YOUR* coolant problem?

CASE HISTORY #1

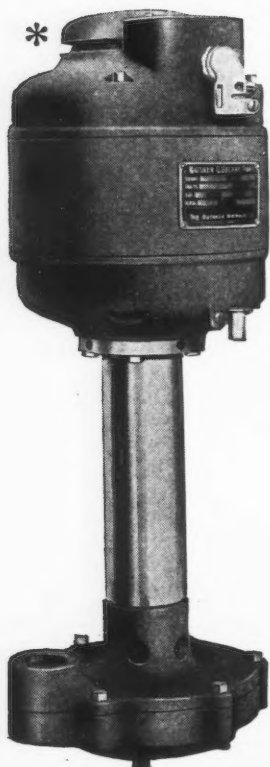
PROBLEM...

The coolant pump on a large gear cutter was not delivering coolant for a considerable interval after the machine was started. The result was that on close tolerance work there was a distinct chance of overheating and distortion.

SOLUTION...

A Ruthman Gusher Coolant Pump was installed on the gear cutter. It gave an instantaneous copious and dependable flow of coolant within split seconds of the start of the machine.

YOU CAN SOLVE IT WITH A **RUTHMAN GUSHER COOLANT PUMP**



Simple in design, sturdy in construction, Ruthman Gusher Pumps are trouble free, long lived, and efficient in operation.

There are fewer parts to wear, resulting in less friction, minimum maintenance costs, constant, dependable operation.

Ruthman Pumps need no priming and they can be throttled without building up pressure.

So specify Ruthman Gusher Pumps on your machines. There's a model for every requirement.

For full information on all models and types—

WRITE FOR CATALOG 10B

THE RUTHMAN MACHINERY CO.

1821 READING ROAD CINCINNATI 2, OHIO

THE "GUSHER"

A MODERN PUMP FOR MODERN MACHINE TOOLS

NEWS OF INDUSTRY

Recent Upsurge Shown For Both Freight And Passenger Car Awards

New York

••• Recent freight and passenger car inquiries and awards include the following:

The Detroit, Toledo & Ironton Ry. has purchased from the Pressed Steel Car Co. 100 70-ton all steel hopper cars and 200 50-ton box cars. The Illinois Terminal Ry. Co. has increased its recent order of 200 50-ton box cars from the American Car & Foundry to a total of 350 cars.

The Nashville, Chattanooga & St. Louis R.R. has purchased from Pullman-Standard Car Mfg. Co. 500 50-ton box cars, 200 50-ton high side gondolas, and 300 50-ton hopper cars. Western Maryland R.R. has placed an order with the Bethlehem Steel Co. for 600 50-ton hopper cars for first and second quarter 1947 delivery.

The Greenville Steel Car Co. is bidding on 500 to 1000 20-ton high side gondola cars for the Turkish R.R. The Baltimore & Ohio R. R. is inquiring for 2000 50-ton hopper cars in addition to the 1000 box cars already placed recently with Pressed Steel Car.

The Missouri & Illinois Ry. Co. is inquiring for 100 70-ton hopper cars, 50 70-ton covered hopper cars and 18 special container cars. The American Refrigerator Transit Co. is inquiring for 2000 40-ton refrigerator cars.

Bids must be in by Sept. 30 on the 400 subway cars and 30 trucks which are to be purchased by the New York City Board of Transportation. The Wabash R.R. is building in their own shops the bodies for 118 50-ton all steel hopper cars.

The Pressed Steel Car Co. is asking for bids on wheel and axle sets for 80 passenger coaches and 22 combination passenger and baggage coaches for the Chesapeake & Ohio R.R.

The Chicago & Northwestern R.R. has purchased 46 various type passenger cars for delivery in the third quarter of next year from the Pullman-Standard Car Mfg. Co. The Southern Pacific

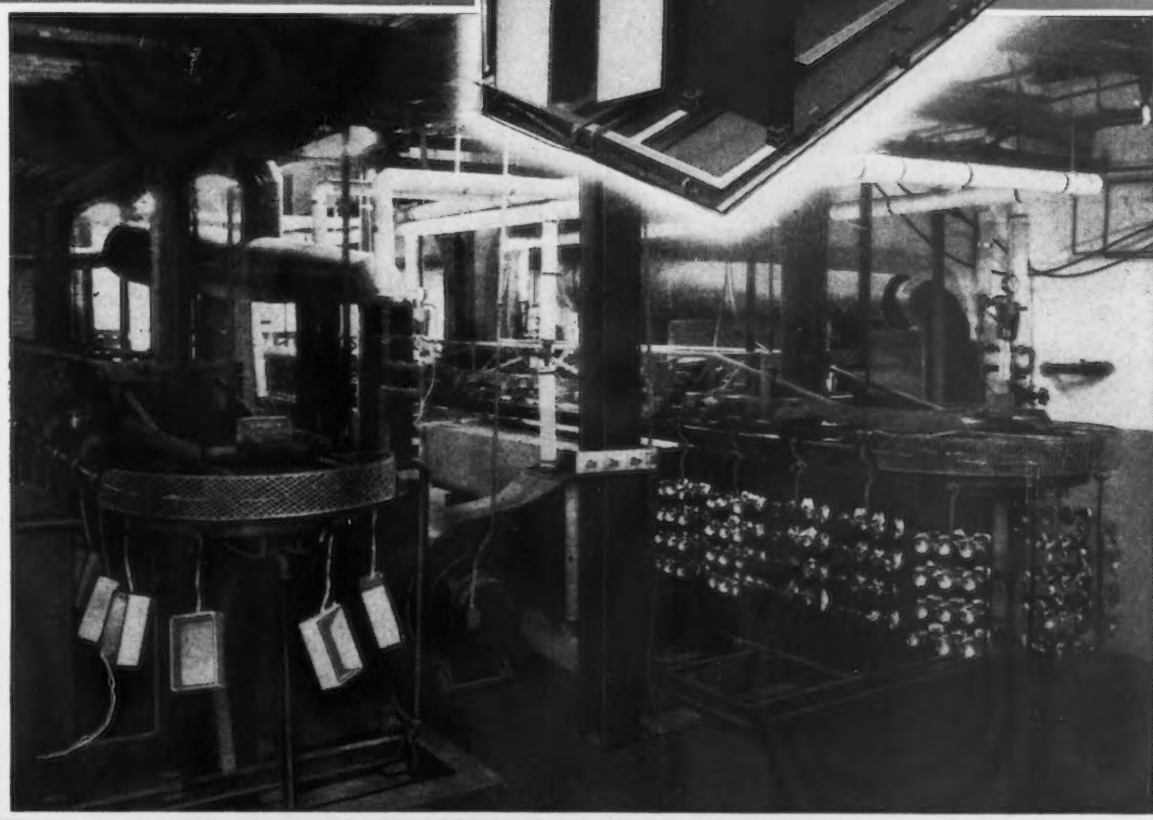
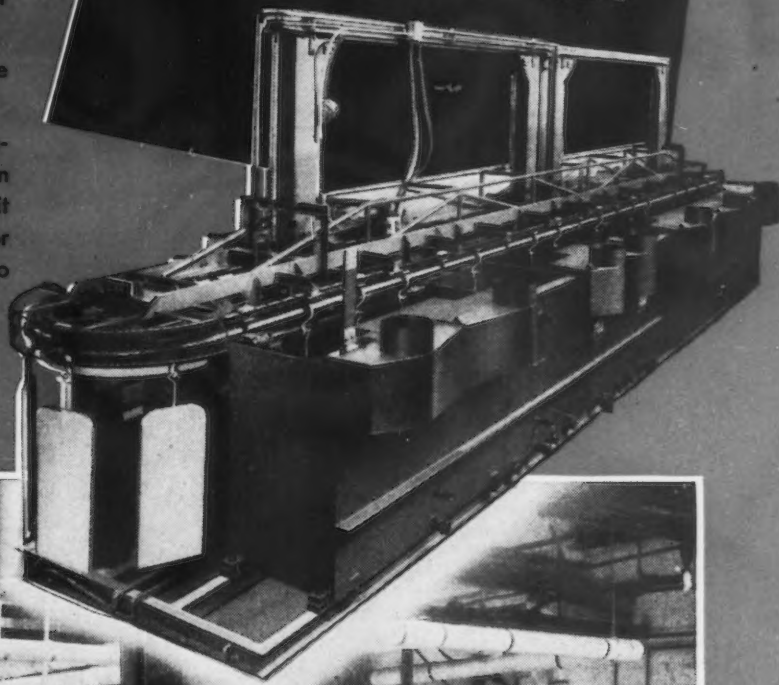
(CONTINUED ON PAGE 148)

The general manager of a modern, progressive manufacturing plant producing skates and radios (we'll tell you the name if you insist) has recently installed two Udylite Full Automatic Plating Machines. Here's what he says about them: "Everyone is enthusiastic about the performance of these machines and we estimate that we save in the neighborhood of one-third of the cost of plating over what we had before."

And this man is by no means the first to make such a statement.

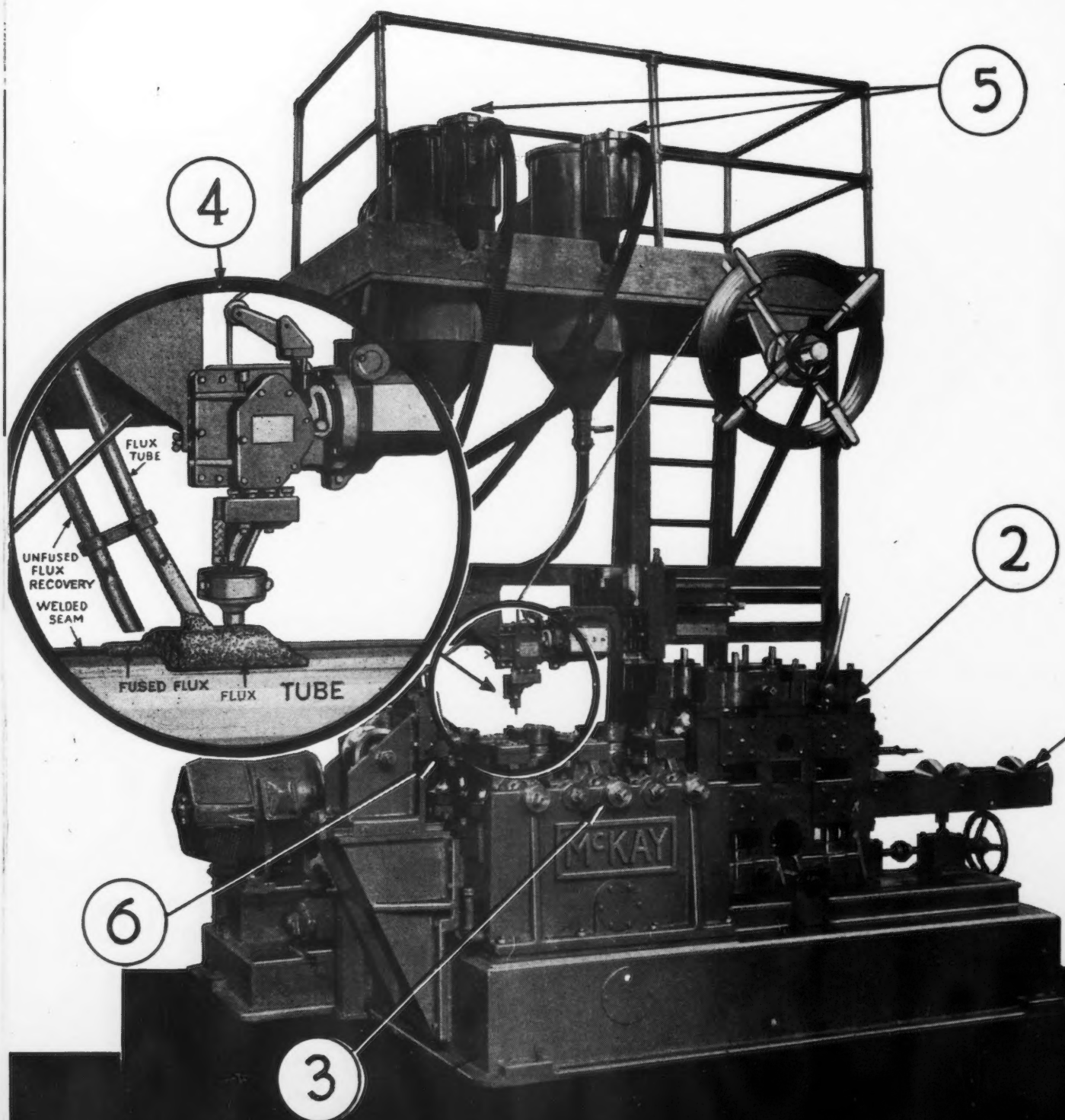
Whenever any manufacturer can save one-third of his production cost it is more than casually important. How important would it be to you? Wouldn't it be worth while for you to check into what this machine could do in your plant?

**ANOTHER USER
Says—
THESE MACHINES
SAVE REAL MONEY**



THE Udylite CORPORATION
1651 EAST GRAND BOULEVARD
DETROIT 11, MICHIGAN
REPRESENTATIVES IN ALL PRINCIPAL CITIES

MCKAY



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Submerged Melt **WELDING** *Machines*

Wartime necessity for greater speeds in welding of heavy plate, tubes and other shapes was a contributing factor toward development of automatic machines and new processes.

Notable progress was made in the various welding methods which are proving equally advantageous in industrial post-war planning.

The "SUBMERGED MELT WELDING PROCESS" (as illustrated) is used extensively for joining various types of metals. This process is particularly adaptable for longitudinal butt welding of heavy wall tubing, due to its many advantages, some of which are listed below:

- (a) One pass welds impossible in heavy wall thickness.
- (b) Heavy welding currents (up to 4,000 Amps. or more) can be used.
- (c) A.C. or D.C. welding current can be used.
- (d) Ferrous and non-ferrous metals can be welded.
- (e) Weld quality is excellent—welds are smooth, clean and uniform.
- (f) Very little weld metal is deposited.
- (g) No metal loss from spatter or vaporization is encountered.
- (h) Minimized distortion is a result of high speed, narrow weld zone, and concentrated heat.

The "Submerged Melt Welding Process" utilizes a granulated material of special properties which is hopper fed by gravity to the welding zone. The granulated flux material covers the welding rod and the fused metal at the welded seam, thereby eliminating a flashing arc and affording a protective cover to the fused weld metal until it is sufficiently cooled. The weld is continuous and the unfused granulated flux is reclaimed by suction type melt recovery units. The portion of the flux which is melted and adheres to the weld seam is removed by a flash trimmer located on the exit side of the welder.

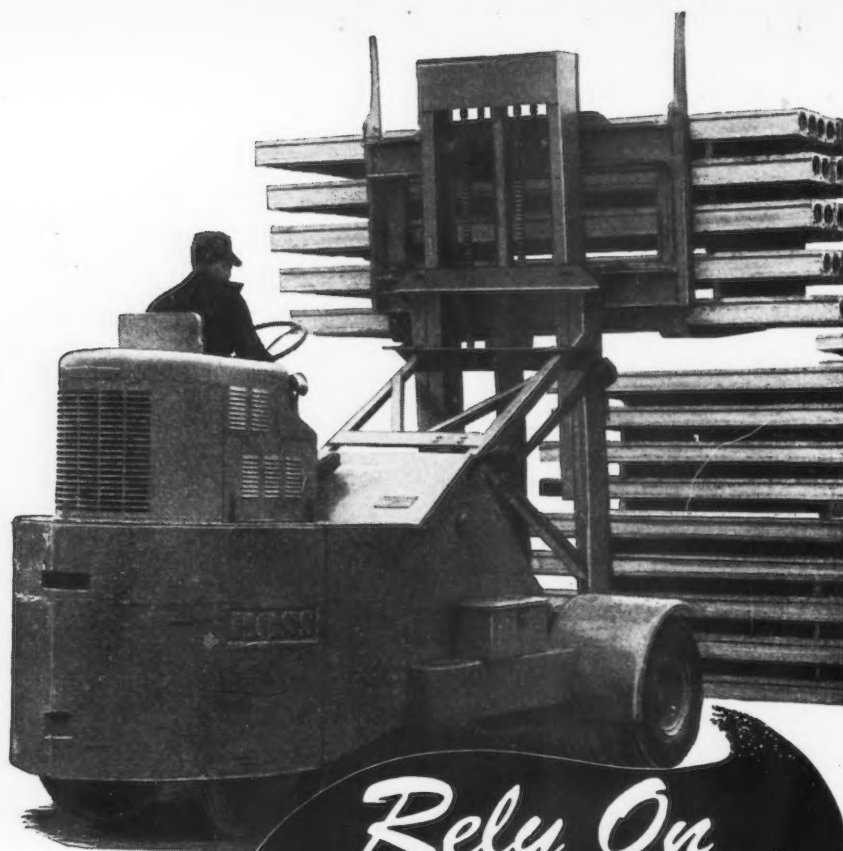
The **McKAY MACHINE** *Company*

ENGINEERS AND MANUFACTURERS OF SHEET, TIN, AND STRIP MILL EQUIPMENT

YOUNGSTOWN, OHIO

ASSOCIATED COMPANY

The WEAN ENGINEERING CO., Inc. • WARREN, OHIO



Rely On
ROSS

to INCREASE CAPACITY OF STORAGE FACILITIES

Big loads, heavy loads—weighing 6,000 to 18,000 pounds—tiered swiftly, safely to height of 25 feet with ROSS Heavy Duty LIFT TRUCKS. That's just one of the many ways ROSS can reduce your handling costs, increase your plant's efficiency! Let our engineers show you how the ROSS System of heavy duty Lift Trucks and Straddle Carriers will easily tie in with your present handling methods.

*Rely on The ROSS System... built to handle
your BIG, BULKY, HEAVY LOADS...*

for comprehensive ROSS BOOK IA-96

THE ROSS CARRIER COMPANY

300 MILLER STREET, BENTON HARBOR, MICHIGAN, U. S. A.
DIRECT FACTORY BRANCHES AND DISTRIBUTORS THROUGHOUT THE WORLD

(CONTINUED FROM PAGE 144)

R.R. has purchased 140 light weight streamlined passenger cars; 41 coaches, diner and lounges to be built of stainless by the Budd Co.; 76 sleeper and mail cars, part of which are to be stainless, from Pullman-Standard Car Mfg. Co.; 23 other cars of various types to be constructed partly of aluminum, corten and stainless from the American Car & Foundry Co.

The New York Central R.R. has ordered from Merchants Dispatch Inc., Rochester, 1000 55-ton box cars and 1000 55-ton auto box cars.

St. Louis San Francisco Ry. asked Federal Court for authority for the purchase of \$7,346,358 new equipment, including three 4000-hp diesel locomotives, \$1,206,294; 38 mail cars, coaches, diners, sleeping cars, \$3,600,492; three 50-ton automobile cars, \$1,628,892; and two 70-ton hopper cars, \$910,680.

WAA Rules on Foreign Sales Seen as Result Of Public Reactions

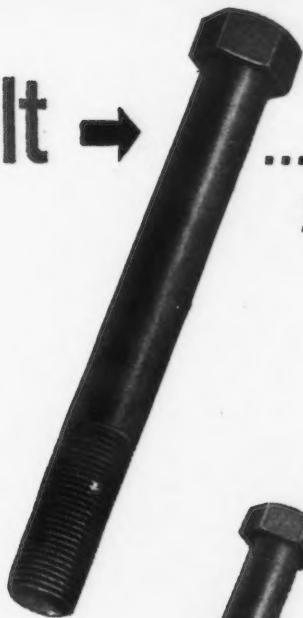
Washington

...WAA's move requiring submission to it for review of all proposed sales of surplus property on a priority basis to public international organizations and giving domestic institutions preference on scarce items is seen as the outgrowth of unfavorable public reaction to foreign shipments or proposed exports of American goods by UNRRA.

An example was the shipment of about 10,000 tons of steel rails originally intended for China to Yugoslavia. The shipment was made at a time that armed forces of that country were shooting down American fliers. Also the object of criticism was the proposal to send 16 surplus ice-making machines to Yugoslavia. War Assets Administrator Robert M. Littlejohn said that these machines would not be sent "until all domestic needs have been satisfied."

Coming on the heels of the WAA order was a statement by acting Secretary of State William L. Clayton that the United States would not stop shipments of UNRRA supplies to Yugoslavia. This policy was not taken to conflict directly with WAA's position inasmuch as

This Bolt →



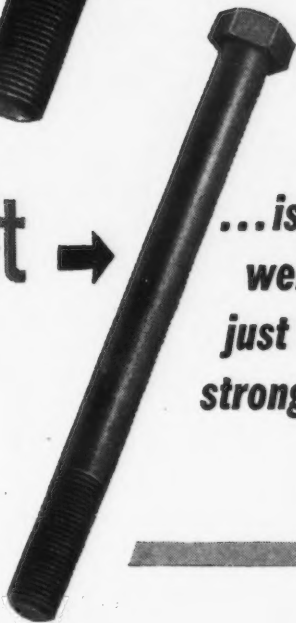
*...is the same size
yet twice as strong as*

THIS BOLT →



...and

This Bolt →



*...is half the
weight, yet
just as
strong as*

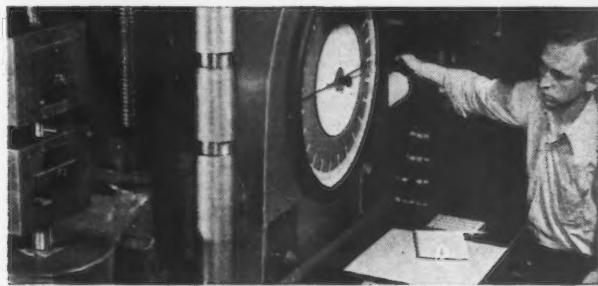
THIS BOLT

**These treated
NICKEL ALLOY STEEL BOLTS
will develop 100% greater unit tensile
strength than untreated carbon steel bolts**

Whether you aim to gain greater holding power, or save weight and gain space, these Nickel alloy steel bolts will help you.

If bolt holes are already in the part, $\frac{3}{4}$ " heat-treated 3135 or 8635 Nickel alloy steel bolt gives twice the holding power of a $\frac{3}{4}$ " untreated 1020 carbon steel bolt.

On the other hand, if bolt holes are not in, and design does not permit a $\frac{3}{4}$ " bolt, remember a $\frac{1}{2}$ " bolt of the same Nickel alloy steels, heat treated, gives almost as much holding power as a $\frac{3}{4}$ " untreated 1020 carbon steel bolt, and weighs less than half as much.



Tensile testing Nickel alloy steel bolts at the plant of Lamson & Sessions Company, Cleveland, Ohio.

EMBLEM OF SERVICE

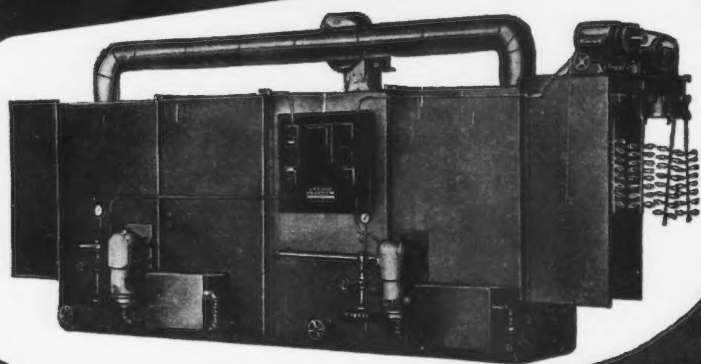


Over the years, International Nickel has accumulated a fund of useful information on the selection, fabrication, treatment and application of alloys containing Nickel. This information and data are yours for the asking. Write for "List A" of available publications.

**THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET
NEW YORK 5, N. Y.**

THE IRON AGE, September 26, 1946—149

For continuous quantity washing
of metal parts on racks



The OPTIMUS Rack Type Washing Machine is designed for continuous handling of large numbers of metal parts on racks before plating, painting, or any similar process. Machine output is high—60 racks per hour is a common figure.

This machine can be used as a single stage washer, or it will handle a number of successive operations, alkaline, acid or neutral. With slight alterations, a series of different problems can be handled, such as washing, rinsing, drying, pickling, cyanide treatment, etc. One of the greatest uses is for removing buffing compositions.

Any plateable part can be washed as long as it is free-draining, and sprays have free access to the parts on the racks. Machine works closed and may be connected to exhaust blower, so fumes, unpleasant odors or excessive heat are not developed. Unit can be heated by steam, gas or electricity.

OPTIMUS Washing, Rinsing, Pickling and Drying Equipment and accompanying Dependable OPTIMUS Detergents can help speed up your operations. Write for details.

SEND FOR NEW BULLETIN



Write today on your business letterhead for your copy of new illustrated bulletin No. 6E1, describing OPTIMUS Equipment and Dependable OPTIMUS Detergents for modern metal parts cleaning operations.

OPTIMUS EQUIPMENT COMPANY

ENGINEERS AND MANUFACTURERS

137 CHURCH STREET, MATAWAN, N. J.

STANDARD AND SPECIAL TYPES OF EQUIPMENT
FROM THE SMALLEST TO THE LARGEST SIZES
FOR A WIDE VARIETY OF OPERATIONS.

OPTIMUS



EQUIPMENT

FOR WASHING · RINSING · PICKLING AND DRYING OF METAL PARTS

the latter does not seek and has no authority to prevent shipments to Yugoslavia. Nevertheless WAA's order promises to slow down UNRRA shipments or call for State Dept. intervention with a view to having them go forward.

There not only were protests over the shipment of rails to Yugoslavia by reason of complications with that country, but also because of the urgent need of rails by American railroads, as well as the Alaskan railroad. The tonnage shipped was small but the policy on denying domestic requirements to the advantage of foreign countries has created growing resentment just as UNRRA itself has because of what is declared its arbitrary and tight-lipped manner of operations. While it is an international organization, American taxpayers nevertheless provide 72 pct of the funds it expends so easily.

General Littlejohn in a letter to Representative Roger C. Slaughter, Chairman of the House Select Committee to Investigate Disposition of Surplus Property, disclosed his intention to amend WAA orders which granted international organizations the right to acquire surplus property on the same basis as national institutions. Under the amended regulations, the 11 international organizations eligible to buy surplus property are given fifth place in the priority order.

"In any case in which an international organization and a purely domestic institution apply for the same item of surplus property," the letter said, "the determining factor must necessarily be the extent to which the public interest will be served through the use of the property by the organization or institution to which it is sold."

"It would appear that the public interest would usually be best served, depending on the need evidenced by such applicants and the use to be made of the property in particular cases, by transferring surplus property to purely domestic institutions."

Iron Casting Shipments Up

New York

• • • Shipments of gray iron castings, including soil and pressure pipe, during July 1946, amounted to 811,000 short tons, an increase of 10 pct over the 735,000 tons shipped during June, according to a report released by the Bureau of the Census.

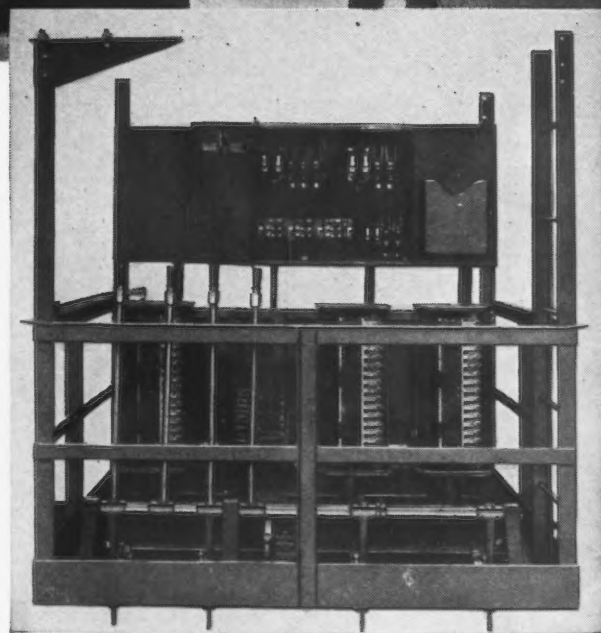


**Provide Maximum Vision,
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Front Lever Control eliminates all need for the operator to lean over the side of the cab to observe floor operations. Levers are grouped near the hook side of the crane cab, permitting a clear, unobstructed view of the hook at all times. The operation of long levers is more natural, easier than the circular turning of crank controls; less tiring. Relieving the operator of strain keeps him alert, more careful, more efficient.

Protective Panels are placed in the rear of the cab, away from the operator. Resistors for various crane motors are mounted up on the crane platform, away from the cab where they cannot cause operator discomfort.

You get these and many other Added Values when you buy a P&H Overhead Crane from America's leading crane builder.



View of P&H standard four controller cab with drum covers removed and safety cabinet open. Note how full vision is possible in all directions. Also grouping of full length front levers on hook side of cab.

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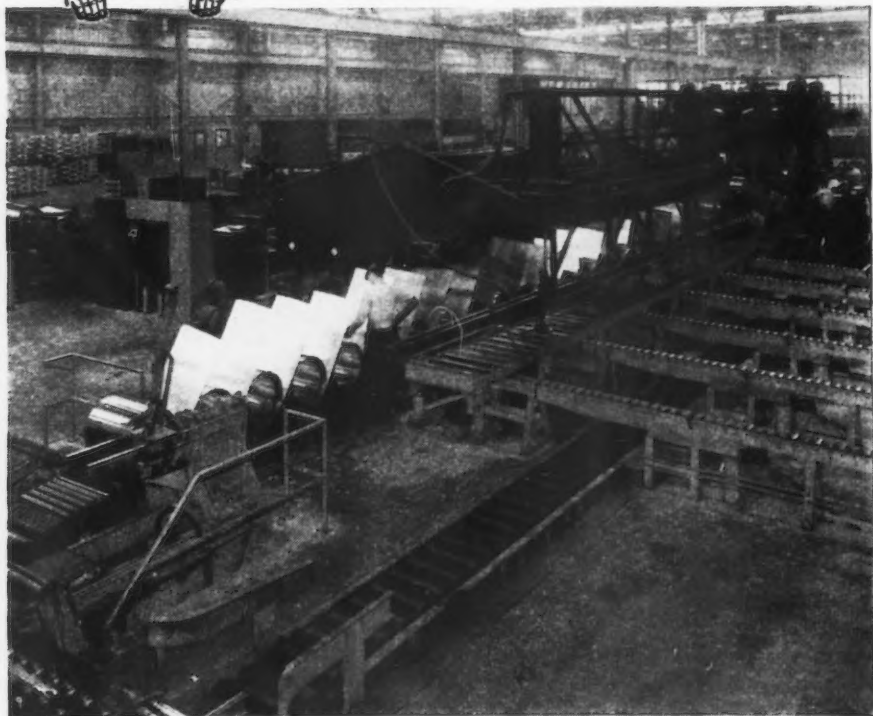
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EVERY manufacturer, in striving to keep costs at a minimum, must deal with more or less difficult material handling problems. These are not always quickly solved, and usually require considerable thought by plant and conveyor engineers. Most experienced plant engineers agree that the use of Mathews methods and Mathews equipment means efficient material handling. That is why Mathews Engineers are usually called in on the problem requiring special attention. There are many types of Mathews Conveyers of both gravity and power designs, and from these types are selected the units which make up Mathews continuous flow conveyor systems. It is with such systems that prominent manufacturers are reducing worker fatigue and keeping materials moving through processing machinery, storage and shipping, with a minimum of product re-handling, costly confusion and delay.

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NEWS OF INDUSTRY

Anti-Corrosion Work Aided by Mistakes In Industrial Experience

San Francisco

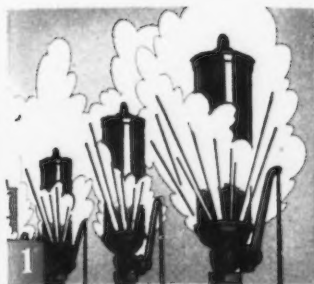
• • • "Much progress has been made in corrosion engineering by a careful study of the mistakes, or unfortunate experience in industry," Wayne Z. Friend and Frank L. LaQue, New York metallurgists, declared in a paper presented before the San Francisco meeting of The American Institute of Chemical Engineers at the Palace Hotel here recently.

"From an accumulation of such experiences, backed up by fundamental research, has come a pretty good understanding of the principal factors which affect corrosion," the authors continued. "The proper application of this knowledge to preliminary laboratory, pilot plant, or full plant corrosion tests usually leads to the selection of suitable corrosion resistant materials and to the proper methods of operation of process equipment to avoid corrosion."

In their paper entitled "Some Histories of Corrosion Problems in Chemical Process Equipment," the authors, both of whom are with the development and research division of The International Nickel Co., Inc., described in some detail a number of corrosion problems which occurred in industry together with the solutions that were finally developed.

"In some cases," the authors continued, "it would have been difficult to foresee ahead of time that the trouble would occur, based on the knowledge then available. In many of them, trouble could have been avoided by a careful consideration of the possible effects of all the corrosion factors involved. In designing new process equipment, or in planning changes in operation of existing equipment, it would be prudent to propose and answer a number of specific questions designed to cover the possible sources of trouble," it was pointed out. "When unexpected corrosion does occur in spite of diligent efforts to avoid it, there is usually no substitute for a thorough corrosion testing program designed to eliminate the various possible causes until the responsible one is found," Messrs. Friend and LaQue added.

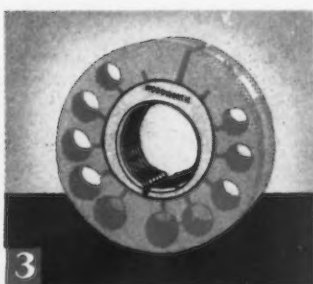
Holy Smokes! They've done it again!



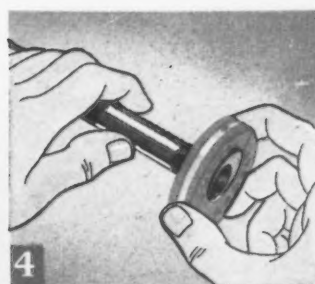
1 Blow all the whistles! They've done it again!



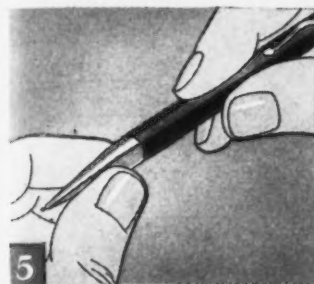
2 Blast out a fanfare for a great new Woodworth invention!



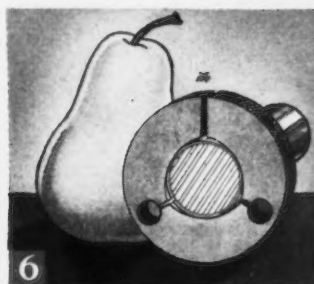
3 It's the Woodworth Adjustable Thread Ring Gage.



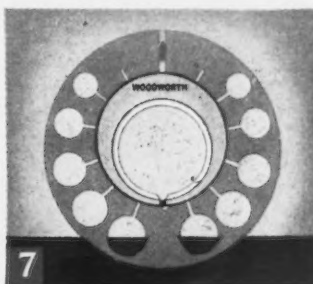
4 Thread ring gages check the O.D. of threaded parts.



5 Adjusting 'em as they wear down saves time and money.



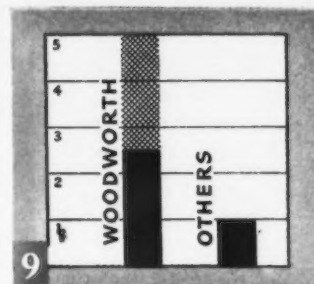
6 But old types get pear-shaped—lose accuracy—wear out fast.



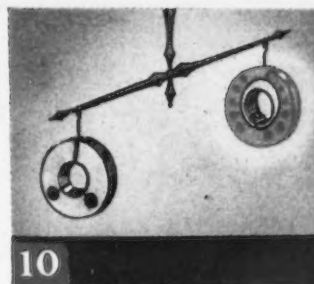
7 This Thread Ring Gage adjusts perfectly—stays round.



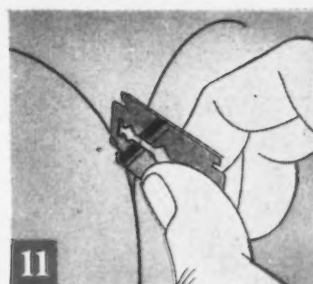
8 Never gets out of line when dropped or thrown about.



9 Equal distribution of wear increases life $2\frac{1}{2}$ to 5 times.



10 Light weight reduces operator fatigue—increases sensitivity.



11 It's amazingly accurate . . . ideal for hair-splitting work.



12 Woodworth's New Thread Ring Gage is an all-time champion!

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THE NEW Adjustable Thread Ring Gage, another revolutionary Woodworth instrument of accuracy, is now available to industry!

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Check these

Five Important Advantages

1. **Greater Accuracy and Stability.** Stays round with adjustment. Threads held in alignment of thread helix angle with adjustment. Will not reject parts that should pass inspection.

2. **Longer Wear Life.** Equal distribution of wear over the full thread


circumference, throughout the entire range of adjustment, increases wear life $2\frac{1}{2}$ to 5 times.

3. **Less Weight.** Aluminum alloy outer body halves the weight to greatly reduce operator fatigue and increase sensitivity.

4. **Positive Identification.** Green outer body for GO GAGE and red for NOT GO GAGE saves time for operator.

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One Plant to Handle All Iron and Steel Operations in Japan

Washington

• • • To continue until next March or until the coal situation eases, it has been decided to concentrate all iron and steel operations in one plant on Kyushu to eliminate "wasteful consumption of coal," says General MacArthur's July report on United States military government activities in Japan. Two rolling mills resumed operations during the month, adding 5000 metric tons to the output.

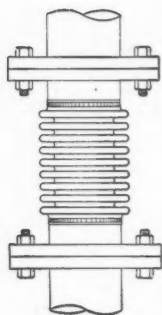
Aluminum production decreased 27 pct during June, the report said. There was a 27 pct increase in lead smelting that month and a 20 pct increase in lead refining. Zinc produced rose 12 pct in June to 1198 metric tons. Minimum domestic zinc requirements were placed at 2000 to 2500 tons monthly.

However, even with increases in production, it was pointed out, the smelting and refining industry was operating 20 pct below normal capacity. The report added that "besides the coal shortage, an intangible deterrent to production is the desire to wait until reparations, prices, government controls and labor problems are settled."

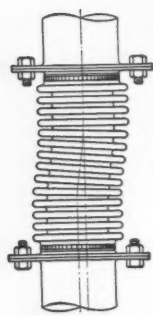
June production of blister copper was 2038 metric tons, an 8 pct increase over May. Production of refined copper was 1868 metric tons, up 43 pct over the preceding month. Nickel and antimony works continued inactive, and production of ferromanganese, silicon manganese and ferrosilicon increased slightly.

The value of June machinery production increased slightly, although manufacture of particular items fluctuated. Manufacturers were "unable or unwilling to commit themselves to long range programs," the report states.

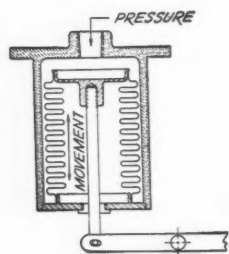
The number of machine tool manufacturing plants has declined steadily from 338 in 1945 to a present 205. Causes of the present decline are listed as: Small demand; fear of reparations; frozen finances; reluctance of the government to allocate raw materials, and increased absenteeism due to food shortages. The same factors apply in other machinery industries, it was said.



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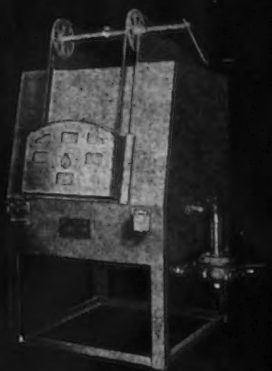
Plants: Maywood and Elgin, Ill.



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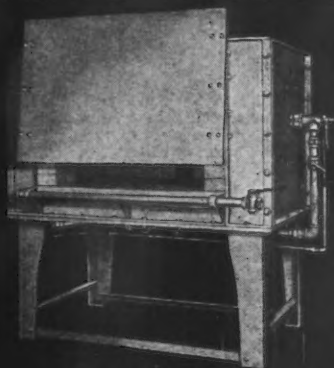
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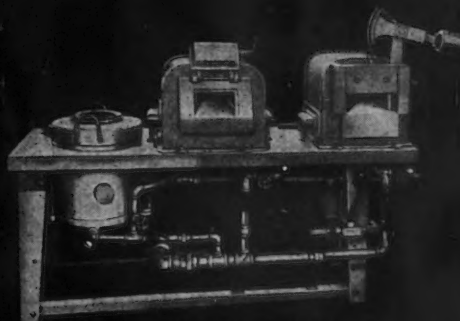
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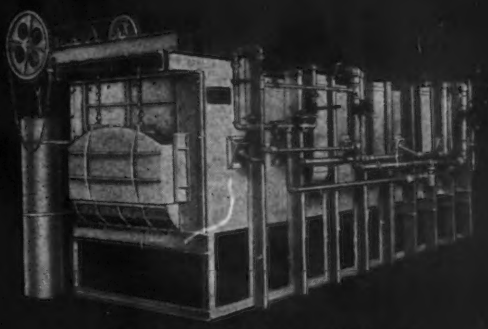
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In Oakite Protective Oil

TO GUARD AGAINST RUST

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MATERIALS • METHODS • SERVICE

Aluminum Output Fell 36 Pct in 1945 as War Production Declined

New York

• • • Primary aluminum output in the United States in 1945 is estimated at 496,487 short tons, a decline of 36 pct from the 776,446 tons produced in 1944 and 46 pct below the all-time high of 920,179 tons in 1943, according to the Bureau of Mines, U. S. Dept. of the Interior. There was a moderate production increase early in the year as a result of temporary military reverses on the western front in Europe, but output dropped steadily after May as the war drew to a close. All Government-owned aluminum metal and alumina plants were closed by Oct. 31, 1945, leaving only the privately-owned plants of the Aluminum Co. of America and Reynolds Metals Co. in operation.

Recovery of secondary aluminum in 1945 totaled 298,387 short tons compared with 325,645 tons in 1944. It included 2,241 tons of aluminum as pure metal (98.5 pct), 293,871 tons in aluminum alloys, 1,162 tons in brass and bronze, 267 tons in zinc-base alloys, and 846 tons of aluminum in chemical compounds. Production in the form of secondary ingots totaled 198,426 tons (214,879 tons in 1944). The secondary aluminum recovered in 1945 required the consumption of 323,676 tons of aluminum scrap, of which 10 pct was old and 90 pct was new scrap.

Stocks of virgin ingot aluminum held by the Reconstruction Finance Corporation on December 31, 1945,

totalled 185,750 short tons. Total stocks of primary and secondary aluminum held by producers, distributors, consumers, and the Government plus that available from wrecked and obsolete aircraft are estimated to have been more than 1,000,000 tons at the end of 1945.

The average value of primary aluminum shipped in 1945 is estimated at 14.3¢ per lb compared with 14.3¢ in 1944 and 14.4¢ in 1943. Quoted prices for virgin ingot remained at 15¢ per lb and for pig aluminum at 14¢ throughout 1945.

Apparent domestic consumption of primary aluminum in 1945 increased 7 pct to 796,081 short tons (744,627 in 1944). This figure is somewhat inflated, however, inasmuch as Government stocks in the United States increased greatly during the year. As military requirements for aluminum declined, large quantities of the metal began going into roofing sheet, railroad cars, truck and bus bodies, civilian aircraft, ship superstructures, small-boat hulls, furniture, appliances, and hundreds of other articles.

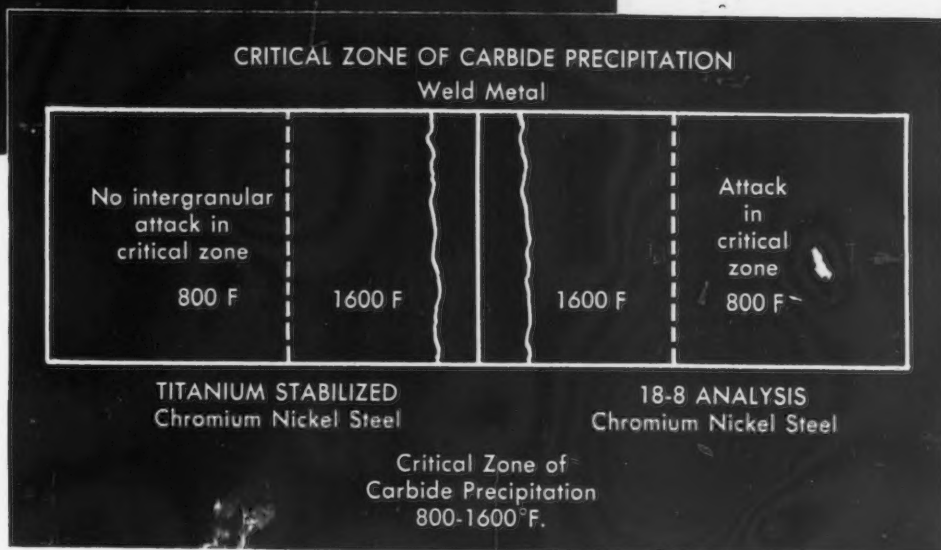
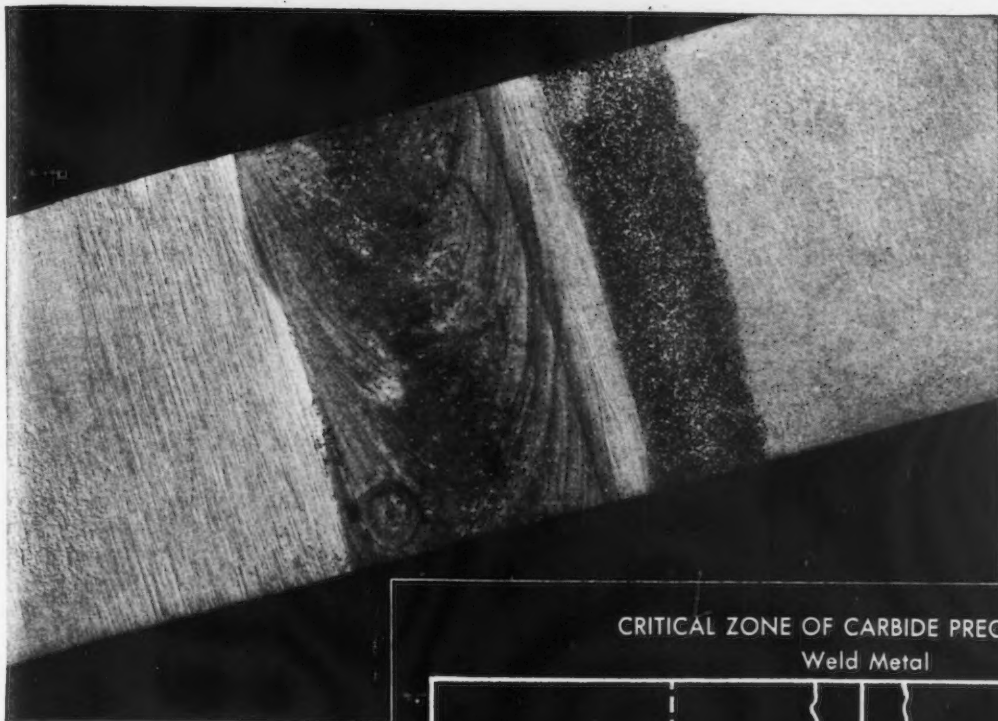
Imports of crude and semicrude aluminum in 1945 reached an all-time high mark of 339,293 short tons valued at \$98,289,943, three times as great as the 1944 entries, according to the U. S. Dept. of Commerce. The tremendous increase was a result of war contracts between the United States and Canada. All of the imports of crude metal, scrap, and plates, sheets, and bars were from Canada, except for 589 tons of plates, sheets, and bars shipped from the United Kingdom. Imports of aluminum (crude metal and alloys only) constituted 42 pct

Production, imports, exports, and apparent consumption of primary aluminum and production of secondary aluminum in the United States, 1941-45
Aluminum Statistics

Year	Primary Aluminum				Secondary Aluminum	
	Production		Imports (Short tons)	Exports (Short tons)	Apparent Con- sumption † (Short tons)	
	Short tons	Value				Value*
1941	309,067	\$100,395,000	13,358	7,405	302,768	106,857
1942	521,106	151,371,000	112,112	38,747	588,969	196,464
1943	920,179	265,380,000	135,581	117,624	877,349	313,961
1944	776,446	222,416,000	100,969	188,108	744,627	325,645
1945	496,487	141,924,000	334,125	5,741	796,081	298,387

† Data not available on fluctuations in consumers' stocks. Withdrawals from producers' stocks totaled 55,320 in 1944; additions to producers' stocks totaled 12,232 tons in 1941, 5,502 in 1942, 60,787 in 1943, and 28,790 in 1945.

* Based upon average price of primary aluminum as reported to the Bureau of Mines.



HOW

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In the welding of austenitic stainless steels, the retention of carbides in solution is not possible because the resulting heating between 800 and 1600°F. precipitates the carbon present as chromium carbides in an intergranular pattern. In this condition the zones near the welds are predisposed to intergranular corrosion in certain media.

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NEWS OF INDUSTRY

of the apparent consumption of primary aluminum during 1945.

Exports of crude and semicrude aluminum during 1945 dropped to 6,543 short tons valued at \$3,064,240 from the previous year's peak of 188,521 tons valued at \$73,578,734. Virtual cessation of Lend-Lease shipments of primary aluminum to Russia caused the precipitous drop in exports. Of the 1945 exports of ingots, slabs, and crude metal totaling 2,209 tons, 520 went to Brazil, 476 to U.S.S.R., 261 to Mexico, 178 to Canada, 144 to Chile, 133 to Argentina, 122 to Cuba, 117 to Uruguay, 90 to Sweden, and less than 50 tons each to 13 other countries. Of 802 tons of scrap aluminum exported, 353 tons went to Canada, 252 to Mexico, 140 to Brazil, 56 to Cuba, and less than 1 ton each to Venezuela and Bermuda. Of 3,532 tons of exported plates, sheets, bars, etc., 1,375 tons went to U.S.S.R., 935 to Canada, 480 to Brazil, 163 to Colombia, 163 to Mexico, and less than 100 tons each to 44 other countries.

World production of primary aluminum is estimated at 916,000 metric tons in 1945 compared with 1,702,000 tons in 1944. The greatest decline in output was in Germany and the central and southeastern European countries where facilities were captured during the first 4 months of the year. Of the 1945 production, it is estimated that 49 pct was by the United States, 21 pct by Canada, 9 pct by U.S.S.R., 4 pct each by France and United Kingdom, and 13 pct other countries.

WAA to Dispose Of Small Surplus Lots

Washington

• • • Certain small lots of surplus items valued at \$100 or less will henceforth be turned over to WAA for disposal regardless of smallness of the lots. These were previously disposed of by the owning agency.

The new order includes the following special classifications:

Items on the veteran set-aside list; spare parts, tools or accessories when declared together with the mechanical equipment to which they belong such as tool and repair kits; small lots of new tools, attachments and accessories for machine tools; and, items of maintenance equipment or supplies (fire-fighting equipment, alarm systems, etc.) when taken from complete industrial facilities.

Information Free

(1) Steel Buyers' Guide:

Catalog gives data on cold-finished carbon bars, cold-finished and hot-rolled alloy bars, turned and ground shafting, tool steels, drill rods, spring and shim steel. Also included are hardenability charts. *Bissett Steel Co.*

(2) Spray Equipment:

Information on the company's complete line of low pressure spray equipment is available in catalog 86. Manual and automatic spray guns, nozzles and tips for all materials, pressure tanks and control heads and many other items are fully covered. *Seipps Air Brush Co.*

(3) Air Tools:

Booklet No. 30 emphasizes the true cost of portable tool operations and suggests specific methods for cost cutting for various types of operations. Booklet also treats cost cutting in various applications and shows the exact portable tool suitable for each type of operation. *Rotor Tool Co.*

(4) Tipped Twist Drills:

Dimension charts and price lists are contained in folder on solid carbide and carbide tipped twist drills, used for drilling in abrasive materials and plastics and nonferrous metals. *Super Tool Co.*

(5) Electroplating Conveyor:

Bulletin FA-102 is profusely illustrated with photographs and phantom assembly drawings and describes the full line of full automatic electroplating conveyors made by the company, including the elevator type, the Munnings type, the straight line type, and a variety of special plating machines. *Hanson-Van Winkle-Munnings Co.*

(6) Diamond Wheels:

Suggestions on the use of diamond wheels as well as various tables of dimensions and prices of metal bond and ceramic bond wheels are contained in this booklet. *Diamonds & Tools, Inc.*

(7) Presses:

Illustrations and the major features of mechanical presses which provide unusual accuracy and speed, low overall operating and maintenance costs, as well as ease of operation, are given in this catalog. *A*

second section is devoted to hydraulic presses which are made in a large variety of sizes and capacities. *Clearing Machine Corp.*

(8) Chemical Materials:

Booklet lists in easy reference form chemicals and industrial explosives and the more than 50 industries which utilize these products. Applications of chemicals in plastics, paints, textiles, film, adhesives, paper, rubber and insecticides are discussed. *Hercules Powder Co.*

(9) Electronic Equipment:

Preventive maintenance techniques designed to maintain top efficiency in performance, to minimize unwanted costly interruptions in service, and to eliminate major breakdowns are outlined in handbook, "Maintenance of Industrial Electronic Equipment." Six basic maintenance operations are discussed in this booklet B-3658. *Westinghouse Electric Corp.*

(10) Shop Equipment:

Hallowell steel shop equipment is featured in catalog, giving sizes, types and prices, together with illustrations of various benches, chairs, cabinets, tool stands, etc. *Standard Pressed Steel Co.*

(11) Welding Equipment:

Bulletin designed chiefly to assist in the selection of proper resistance welding equipment for specific production jobs, features illustrations, photographs, charts, engineering data, and descriptions. Another bulletin illustrates various air operated, hydraulically operated and manually operated types of portable welders. *Taylor-Winsford Corp.*

(12) Precision Ball Bearings:

Ball bearings illustrated and described in catalog 2000 are single row radial, metric, Conrad or non-fluting notch type. Information given will be of assistance in the proper interpretation of the tabulated load data for the majority of straightforward bearing applications. *Jack & Heints Precision Industries, Inc.*

(13) High-Production Presses:

High-production presses, ranging in size from 3 to 300 tons are illustrated and described in catalog 27-A. Three different sizes and designs of coil cradles for feed-

ing stock automatically are also described. Typical specimens of a wide variety of complex parts with progressive and compound dies are illustrated. *E. W. Bliss Co.*

(14) Reamers:

Heavy duty solid reamers, heavy duty shell reamers and shell reamer arbors are described in bulletin 291, along with parts and accessories. Dimension tables and price lists are included. *Metro Tool & Gage Co.*

(15) Slip Ring Motors:

Brochure pictures and describes the slip ring induction polyphase motors used for high starting torque, adjustable varying speed applications and reversing operations. Stators, rotors, bearings and brushes are individually treated. *Century Electric Co.*

(16) Shankless Drill:

Manual S-4 contains complete technical data on this new high speed shankless drill with a continuous flute. New drivers for the drills are covered also, along with complete dimensions and price lists. *Resublic Drill & Tool Co.*

(17) Flexible Couplings:

Flexible couplings for heavy and light duty and high speeds are described in catalog No. 461, with installation and operation, application and selection discussed. Line drawings and illustrations of the various types of couplings are included. *American Flexible Coupling Co.*

(18) Saws:

Bulletin MC-51A describes the Peerless Mechan-Cut four sided saw frame with a backing plate blade support which makes practical high feed pressures and lengthens blade life. Saws also feature automatic, electrically controlled bar feed conveyor. *Peerless Machine Co.*

(19) Permanent Mold Castings:

The procedure used in preparing the molds from the drawing board through the various stages to the finished and tested casting is shown in detail in this booklet. Also included is a discussion of permanent mold gray iron castings, from the point of view of physical and mechanical properties. *Eaton Mfg. Co.*

NOTICE TO READERS: Your request for this information will be forwarded promptly to the manufacturer issuing the literature. The offer is good for only two months.

9/26/46

THE IRON AGE, New York 17, N. Y.

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INFORMATION FREE (Continued)

(20) Test Procedure:

Booklet describes a procedure for testing the locking effectiveness of self-locking nuts and related fastening devices. Also explains the equipment and method for making tests for vibration, installation and removal torque, re-use torque, and wearing and plating. *Elastic Stop Nut Corp. of America.*

(21) Tractors and Trucks:

Pocket catalog, Bulletin 201-C, contains detailed information on the construction features, capacities and designs of all models of Mercury Industrial tractors, trailers and lift trucks. *Mercury Mfg. Co.*

(22) Nickel Alloys:

Catalog D-2 gives engineering data on strength, electrical resistivity, modulus of elasticity, heat treatment, temperature limits and magnetic properties of high nickel content alloys. Also contains sizes, weights, tolerances and other helpful information. *Alloy Metal Wire Co.*

(23) Steel Piling:

Strength, light weight and water-tightness are characteristics of the Corr-Plate steel piling recommended for use in building excavations, dams, retaining walls and other construction jobs. Illustrations and tables give suggested applications, specifications and other data. *Caine Steel Co.*

(24) Steel Die Sets:

Catalog describes firm's line of precision die sets gaged to exceptionally close limits and commercial sets with centerless ground guide pins, recommended for short run tools. Die shoes and punch holders may be interchanged and replaced without expensive rework and fitting. *Standard Machinery Co.*

(25) Weldments:

Typical medium and heavy weldments available from the company, such as engine frames, power unit components, gear blanks, all-welded press frames and hoist drums are shown. Booklet also describes machining and finishing shop facilities. *Lukens Steel, Inc.*

(26) Arc Welders:

Installation, maintenance and overhaul information for motor or belt-driven dc arc welders is given. Trouble-shooting chart gives causes and remedies for various breakdowns which might occur. *General Electric Co.*

(27) Automatic Heat Treating:

Engineering manual gives data on salt bath automatic conveyor equipment for conventional heat treating, Austempering, Martempering, liquid carburizing and cycle annealing. Conveyor system features unit design which permits flexibility in layout and performance requirements. *A. F. Holden Co.*

(28) Bandsaw Lubricator:

Complete report on bandsaw lubrication test showing results on different metals, time, speed and wear. Also described are uses of Elf lubrication and details of attachment to bandsaws. *Monogram Mfg. Co.*

(29) Subzero Temperatures:

New series of illustrated folders cover laboratory and production testing low temperature machines which simulate altitude conditions including subzero temperatures, relative humidity and vacuum conditions. *Bowser, Inc., Refrigeration Div.*

(30) Goggle Valves:

Balloy mechanical goggle valves, made in sizes from 72 in. to 6 in., including totally enclosed designs, for use in washers, precipitators, boiler plants, coke plants and metallurgical plants. Illustrated bulletin gives complete dimensional data. *William M. Balloy Co.*

(31) Anti-Corrosion Alloy:

Wyndalloy, the corrosion-resistant, non-magnetic alloy described in this folder, is available in bar form, forgings or fully machined to specifications. Tables and charts show chemical analysis and physical properties. *Wyndale Mfg. Corp.*

(32) Abrasion Tester:

A precision engineered, electrically-operated research laboratory instrument for accurately testing most types of surface finishes for maximum abrasion resistance is described in a new bulletin. Material applications and wear-testing techniques are also included. *Tabor Instrument Corp.*

(33) Centerless Grinding:

Bulletin 16 contains suggestions for centerless grinder operators and describes and illustrates machine adjustments which will aid the operator in securing proper results from through-feed and in-feed centerless grinding. *Waltham Grinding Wheel Co.*

(34) Time Switches:

Bulletin T-55 presents several different and typical examples of time controls designed and built for special control characteristics, panels and combinations, according to specific needs. *Automatic Temperature Control Co., Inc.*

(35) Electric Tools:

Catalog No. 61 gives data on the Thor line of high frequency electric tools. Tables give complete specifications, standard equipment and extra equipment for each tool. Illustrated are drills, screw drivers, nut setters and grinders. *Independent Pneumatic Tool Co.*

(36) Flexible Shaft Machines:

Machines described in Bulletin 44B feature floating balance and are ball bearing equipped. Pedestal, suspended and bench types are available. Data on attachments such as hand pieces and sanding drums are included. *Elliott Mfg. Co.*

(37) Vibro-Insulators:

An outline on the proper selection of the Vibro-Insulator for specific requirements is given. These insulators are devices of rubber and metal to cushion industrial and manufacturers' original equipment and reduce vibration and noise. Booklet also gives typical applications and a complete table of characteristics of each type. *B. F. Goodrich Co.*

(38) Management Services:

Scope of engineering and management service and how it functions in planning development and expansion of manufacturing industries is explained in brochure entitled "The Answers to Industry's Problems." Product and machine design, production methods, control and flow, quality control, time and motion studies and other services are discussed. *Pioneer Engineering & Mfg. Co.*

(39) Carbide Tools:

Catalog No. 23 illustrates and gives prices of standard tungsten carbide cutting tools and blanks, special tips, core drills and reamers, milling cutters, gages and dies, etc., and shows typical applications of special design. Characteristics of Willey's Metal are presented and recommendations for machining various metals are offered. *Willey's Carbide Tool Co.*

(40) Heat Treating Furnaces:

Construction and operational features of pusher type furnaces for annealing, hardening and other heat treating processes are outlined in bulletin 123. Revolving retort furnaces for treating ferrous and nonferrous metal products are described in bulletin 124. Illustrations show furnace designs. *W. S. Rockwell Co.*

(41) Machinery Products:

Illustrated catalog gives complete information on features, uses, design of pneumatic drills, screw drivers, riveting hammers, pneumatic tool accessories and other machine shop products. Etchers, demagnetizers, chucks, tachometers are included. *Ideal Industries, Inc.*

(42) Testing Machine:

New bulletin gives specifications for the improved Sonntag universal impact testing machine for metals. The machine, which is easily converted from testing specimens to structural parts, now has six possible ranges—25 and 60 ft.-lb. 50 and 120 ft.-lb. and 100 and 240 ft.-lb. *Baldwin Locomotive Works.*

THE IRON AGE, New York 17, N. Y.

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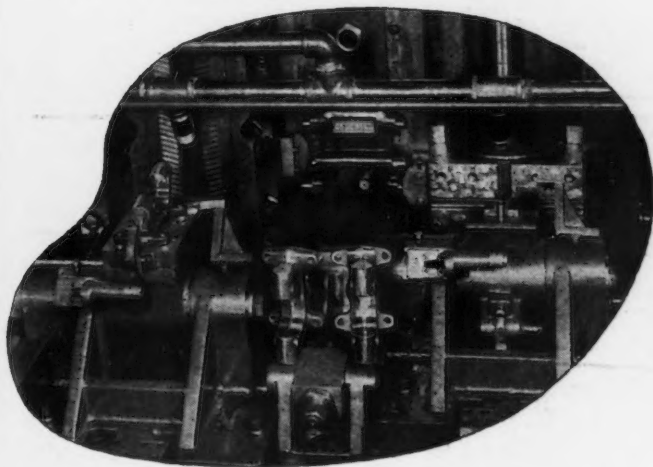
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INCREASE YOUR LABOR-PRODUCTIVITY by broaching ----- WITH *Colonials*

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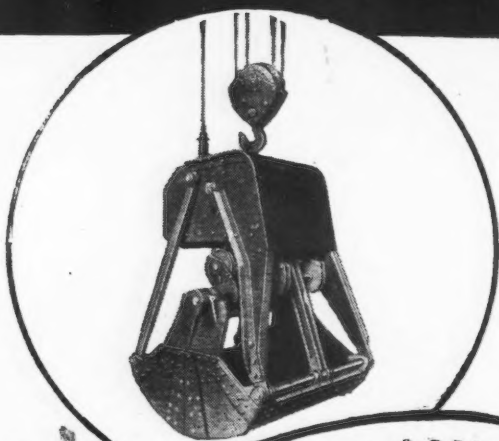
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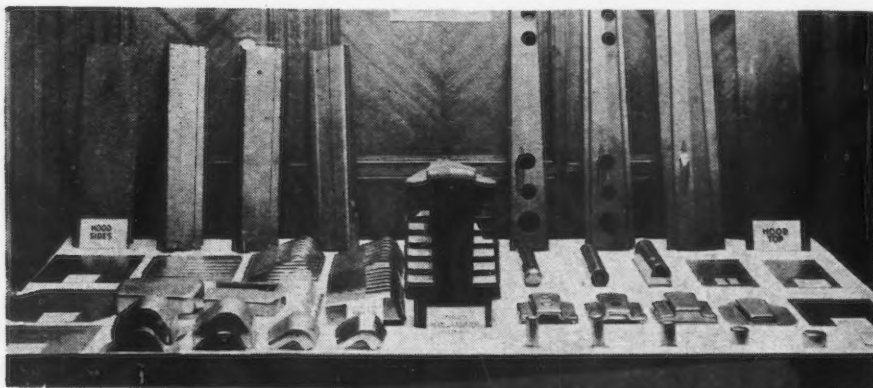
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We make this one observation about *Strenes metal* for drawing and forming dies:

Builders of cars, trucks, tractors—almost all use it—for bodies, fenders, hoods, grills, lights, etc. Farm implement builders use it. Casket and vault manufacturers use it.

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STRENES METAL

FOR DRAWING AND FORMING DIES

162—THE IRON AGE, September 26, 1946

NEWS OF INDUSTRY

OPA Announces No Changes in Ceilings On Imported Goods

Washington

• • • OPA has announced that no overall changes in maximum purchase prices or control of imported commodities are necessary or contemplated at this time as the result of the "world price" amendment [Sec. 2 (x)] to the new price control law.

Maximum purchase prices of important commodities, OPA said, will be increased where the purchases of United States buyers can exert a substantial influence upon the world price because of their volume. Maximum purchase price control will be removed where its maintenance could have no substantial influence upon the world price because the purchases of the United States are small or because sales could be made to foreign purchases at prices exceeding OPA's maximum purchase price due to acute shortage of world supply. Control will be removed also when the imported commodity is unimportant in relation to business or living costs.

No action by OPA is required where United States buyers set the world price by reason of the large volume of their purchases or where the reduction of importations is due to foreign crop failure, production breakdown, lack of transportation or similar causes.

"The world price" is considered to be the typical price at which the imported commodity can be purchased by major buyers at major sources of supply. "Maximum purchase price" includes both a ceiling on what the buyer may pay in the foreign country and a ceiling on the price at which the buyer may import the commodity regardless of how much he paid abroad. It does not refer to the ceiling that the importer may charge upon a resale of the commodity in this country. "Products processed directly" from imported commodities, OPA said, means a product of the first substantial stage of processing.

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Resistance Welding

If you are interested in the possibilities and scope of the various phases of *Resistance Welding*, you will want to receive these Sciaky bulletins: "Resistance Welding at Work." They are brief, informative and pictorial, and for the most part are devoted to step-by-step analyses of interesting production problems solved by spot, seam or flash welding.

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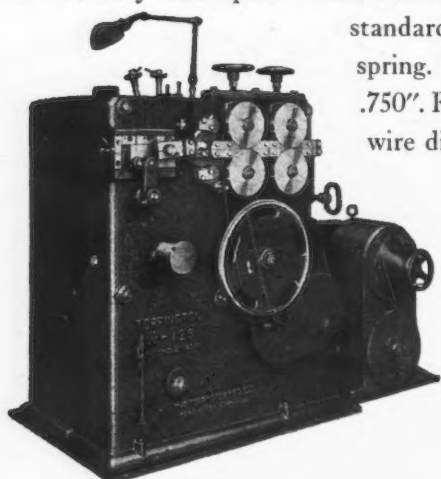
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All fourteen models of Torrington Manufacturing spring coilers are noted for accuracy and speed. With torsion, or other available attachments, standard models will make almost any useful spring. Wire diameters range from .003 to .750". For catalog or quotation, write stating wire diameter range required.



W-125 SEGMENT TYPE SPRING COILING MACHINE

Wire Diameter Range — .080" to .207"
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NEWS OF INDUSTRY

USS Makes Plans For Wider Use of Steel In Home Construction

New York

• • • Plans are now being drawn and competitive costs estimated by U. S. Steel Corp. engineers looking toward wider use of steel in home construction. Inherent strength, dimensions that are the same year in and year out, smooth surfaces, and special steels capable of receiving hard, lasting finishes are listed by officials of this corporation and its subsidiaries as reasons why steel has been urged to take off its hat and stay. They say the next step—which has begun already—is actual home construction.

"Steel is firmly entrenched in the kitchen, laundry, bathroom and basement," according to Dr. R. E. Zimmerman, vice-president, research and technology, U. S. Steel Corp. of Delaware. "It is winning its way into dining and living rooms, bedrooms and the sun room. It may enclose these areas with strong, tough internal and even external walls, cover them with ceilings, connect them with stairways, warm them with radiant heating pipes, and cool them with air-conditioning ducts."

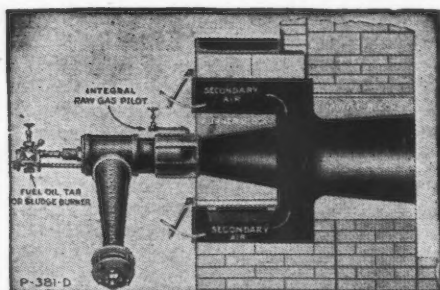
Among new steel home developments that veer from furnishings toward the structural, still on the drawing board, is an all-steel cabinet designed to cover an entire bedroom wall—or, in new construction, to serve as a wall between two bedrooms, available to both, thus saving 6 to 8 in. of partition space. Fitted with tightly closing doors, this cabinet will contain removable trays for shoes, drawers for personal linen and lingerie, shelves for hats, blankets, pillows and other bedroom articles, and separate closets for clothes. The tight, vermin and dust-proof doors make it possible to set aside one closet for storage of winter clothes, which may be additionally protected by DDT spray, according to U. S. Steel.

Another steel cabinet still in the design stage will provide shelves and drawers for household linens. Equipped with sliding doors, it will be practically dust-tight, as well as vermin-proof, and may be connected with a clothes chute. A new all-steel cabinet for sale at



TANDEM COMBUSTION UNIT ... economical and efficient ...

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The Tandem Combustion Unit can be "lighted off" in a cold furnace and brought quickly to full capacity with a clean flame. It is economical and efficient, has a high turndown ratio, with a steady flame, adaptable to high-low combustion control; and can maintain a high flame temperature on either gas or fuel oil. The flame (regulated and directed) uniformly radiates heat to the absorber vessel without flame impingement.

Burning fuel oil, tar, sludge or gas, the Tandem Combustion Unit is extremely versatile, is economical of fuel and requires minimum supervision and maintenance.

Write for detailed information.

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OIL BURNERS • GAS BURNERS • GAS PILOTS • PUMP SETS • EXPLOSION DOORS
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a modest price is also being designed especially for canned goods in kitchen or basement.

A complete home unit which has already proved its worth is the prefabricated shower stall, made from porcelain-enameled or stainless steel. Bathtubs, too, are now fabricated from sheet steel and finished in porcelain enamel, thus combining substantial weight saving with the beauty of lasting finish in a variety of colors. Similarly, lavatories, sinks and laundry trays are being pressed from sheet steel and finished in porcelain enamel.

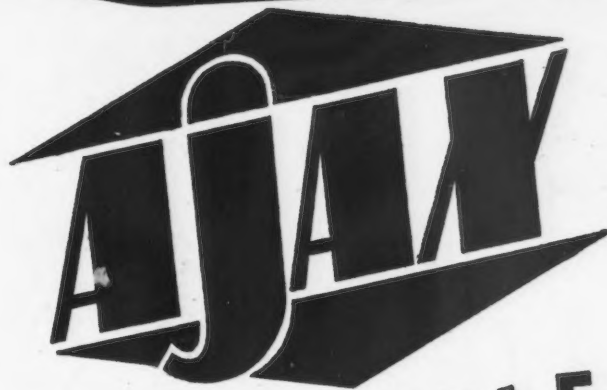
Another new unit being considered for the home is a steel toilet, the bowl, trap and drain pipe of which would be formed from stainless steel, while the supporting shell would be of porcelain-enameled sheet steel in color. This shell would fit against the wall, hiding trap and fittings, and the use of a trip valve would eliminate the awkward flush tank.

A steel unit for the home also likely to win wide acclaim is the prefabricated steel staircase. Introduced before the war, it has been installed in a considerable number of multi-storied dwellings and has the advantage of single-unit construction, is creak-free, fire-resistant and easily installed.

Steel may be especially selected for its specific job, say these technologists. This does not mean a new steel for each new use, but rather that a suitable composition may be chosen from an already large list. The uniformity of mill production — the same system which produced the automobile, the washing machine, the refrigerator, as well as thousands of other objects—helps to make the American standard of living the highest on earth.

This technique can be used to produce unit steel housing sections. Most of the experimental work has been done and successful examples of this type of construction in many cost brackets may be seen in various parts of the country.

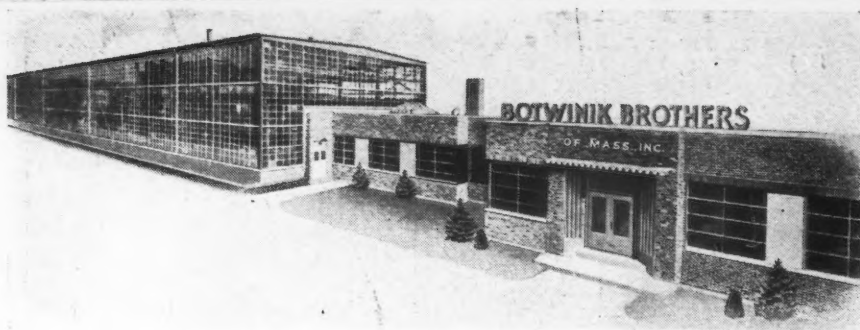
The properties of steel make it ideal in home construction, officials of United States Steel Corp. point out. It is easily fabricated, adaptable to numerous methods of finishing and, finally, it is economical. One of the important considerations is that steel may di-



FLEXIBLE COUPLINGS

The fact that all the horsepower goes through the coupling emphasizes the importance of protecting direct-connected machines against misalignment.

AJAX FLEXIBLE COUPLING CO. INC., WESTFIELD, N. Y.



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One of the largest rebuilders of machine tools in the country, Botwinik knows all the treatments for production ills. Take advantage of our modern facilities, our engineering skills and our iron-clad guarantee of satisfaction. Whether it is one machine or your whole plant that needs tuning up, rely on Botwinik to provide your equipment with utmost operating efficiency at low cost.

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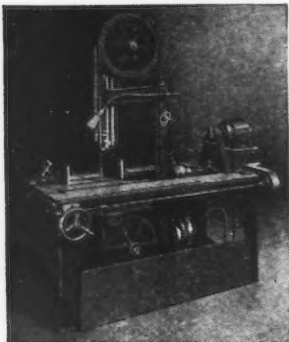
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much!*

**No Other Saw
Can Do As Much!**

MARVEL Universal Band Saw, 18" x 18" capacity, will cut-off, slot, trim, split bar stock, rough-out, or split sections, pipe, structural, large standard shapes, or small irregular shapes, with speed, ease, and convenience. Few shops working with metal can afford to be without this most versatile of all saws.

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Mitre cutting is simple and accurate with the MARVEL Series 8 Band Saw. No change in position of work. Simply set the saw column at any required angle up to 45° either right or left of vertical. Do not confuse with any other "band saw." There is no other machine like the No. 8 MARVEL.

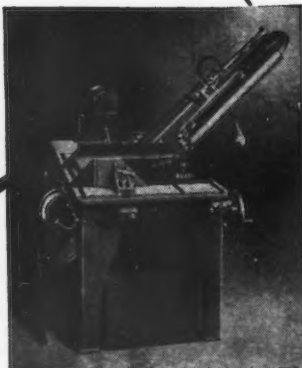
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NEWS OF INDUSTRY

rectly replace several materials performing different functions, steel performing all these functions together.

When this modern practice is followed, according to the experts, steel unit panels offer the following advantages:

- (1) Ample stud strength is assured by proper design.
- (2) Good insulation is assured by provision of dead air space.
- (3) Condensation difficulties are overcome by use of insulation.
- (4) Steel panels provide a flat, true interior wall, ready for any desired type of finish.
- (5) Since steel surfaces do not "breathe," the walls remain cleaner and, consequently, easier to maintain.
- (6) Speedy erection and completion.
- (7) Adaptability to radiant heating.
- (8) Flexibility of steel unit design results in greater ease and simplicity of construction, storage and movement of material.

No unusual foundation problems are encountered in preparing for modern steel home construction, it is claimed. Floor units are fabricated from steel sheets formed into panels which can be bolted directly to the foundation. Over these rigid panels a mastic top coating is applied and wood block flooring or linoleum set in.

Vertical steel panels, designed to provide desired insulation, smooth wall surfaces, and also the strength required to support a second floor or roof, are attached to the floor units. The wall panels are room height, assembled into sections to provide a 4-ft module for easy erection. Other panel groups contain window and door sections.

Outside, these modern steel houses can be of familiar materials, such as brick, stone or wood—or long-lasting porcelain enamel fused on steel, easily washed and requiring no new coat from year to year, may be used. Windows have steel sections and frames. Their sills usually are made of porcelain-enameled steel.

Home buildings and apartments constructed of steel panels are no idle dream, say United States Steel officials. Many have been erected in various parts of the country.

One such building, in River Forest, Ill., has 281 apartments and has proved extremely economical to heat and maintain.

Flat roofs can be of normal roof construction with gravel stops of colored porcelain enamel on steel. Gable roofs may be built of light steel framework or pan construction, covered with porcelain-enamelled clapboard-style steel roofing sections. An interesting example of clapboard steel roofing and siding is a housing project near Hammond, Ind., where a number of such houses have been built.

Heating, cooling and air-conditioning equipment may be installed to provide indoor comfort in the steel panel home. Electrostatic dust precipitators, air filters and washers eliminate dust, pollen, germs and odors from the air.

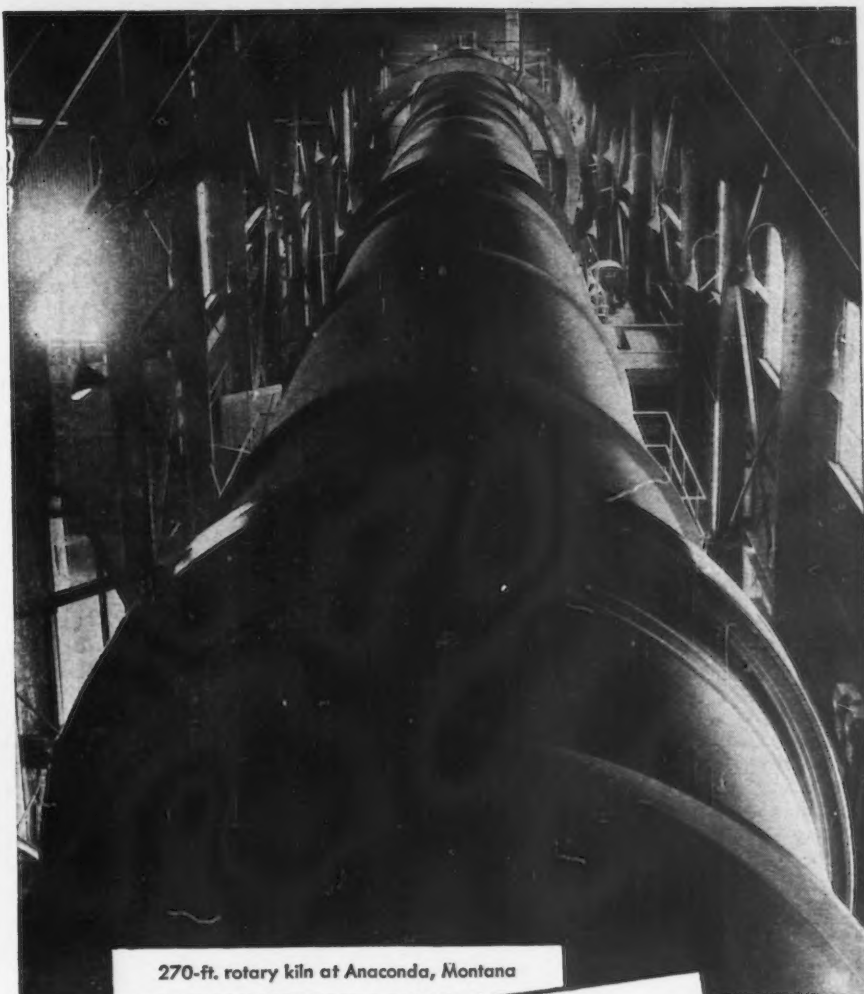
Radiant heat is in immediate prospect for the American home, and steel walls, floors and ceilings are ideal for this installation. One new system circulates air at 130°F above a suspended ceiling, the heated ceiling radiating warmth to persons and objects in the room below. Other new systems use the steel baseboard or cornice panels to circulate the heat.

McKee Company Sales Up

Cleveland

••• Arthur G. McKee & Co. reports that new contract business taken since Jan. 1, 1946, continues in higher dollar volume than in any similar peacetime period. Contracts taken during the present year, including some which have not as yet been reduced to definitive contract forms, approximate \$38,000,000 based on the value of plants to be designed and constructed. The company is constructing two complete blast furnace plants in the Chicago district and one on the Atlantic seaboard. Satisfactory progress in obtaining technical personnel for its recently opened engineering office in Elizabeth, N. J., has been made and the company is presently arranging to double the size of its space in that office.

Progress of work on the contracts taken during the present year has been disappointingly slow, due to delays in deliveries of materials and equipment.



270-ft. rotary kiln at Anaconda, Montana

Anaconda MANGANESE NODULES

AVERAGE ANALYSIS

Mn	60%
SiO ₂	8%
Al ₂ O ₃	0.76%
Fe	3.1%
P	0.06%

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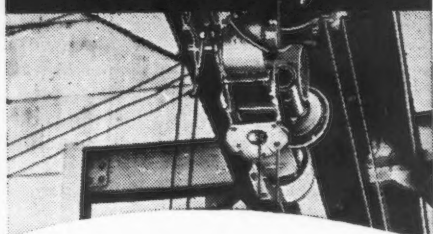
ANACONDA COPPER MINING COMPANY

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Anaconda, Montana

This Hoist LIFTS PRODUCTION LOWERS COSTS

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Each READING ELECTRIC HOIST installed in your plant is "tailor made"—at no extra cost—to fit your own handling operation. As a result you get a hoist that quickly moves your materials safely and easily.

Then too, the simple design of a READING ELECTRIC HOIST gives you a sure way to cut maintenance costs. There are only four moving parts in the hoisting unit. Each part is "easy-to-get-at" for routine inspection and overhauling.

For more information on how you can step-up production and cut costs with READING ELECTRIC HOISTS, contact your nearest Reading Distributor. And if you haven't already sent for your free copy of "144 Answers To Your Hoisting Problems," drop us a line today.



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CHAIN HOISTS • ELECTRIC HOISTS
OVERHEAD TRAVELING CRANES

READING HOISTS

CPA Pushes Veteran's Housing Program by Adding to List of Priorities

Washington

• • • To give further assistance to the veterans' housing program and other essential construction, the CPA has made CC priority ratings available to producers of Portland cement, several plumbing and heating items, and woodworking machinery in order to sustain or increase production.

The items added to Schedule I (Critical Products) of PR 28 were: Portland cement; low-pressure boilers for residential heating; specified builders' hardware items; furnace pipe, fittings and duct work; specified classes of screwed pipe fittings; registers and grilles for heating systems, and woodworking machinery, including power-driven saw blades and saw bits, for the production of logs, lumber, millwork, flooring and plywood.

"Cast iron pressure pipe" was added to the list of castings on Schedule I. Cast iron radiation and convactor radiation were consolidated into one listing. Originally they were listed as two different items. The warm air furnaces listing was changed to read: "Furnaces, warm air, including floor and wall furnaces."

Portland cement producers will be eligible for CC ratings to obtain production materials; construction materials at existing plants; maintenance, repair and operating supplies, and capital equipment for replacement. CC ratings will be assigned for capital equipment to increase production of Portland cement only in areas where the degree of local shortage is materially greater than the degree of national shortage.

CC rating assistance under Schedule I of PR 28 was given to manufacturers of residential boilers, builders' hardware, furnace pipe, screwed pipe fittings, and heating registers and grilles, in order to round out the previous veterans' housing program assistance provided them through listing on Direction 18 of PR 28, which made them eligible for CC ratings to obtain iron castings and steel in the fourth quarter.

CPA also amended Direction 18 to PR 28 to add "steel industrially-

made houses, panels and sections (where principal panel material is steel)" to the list of materials for which CC assistance may be granted to get steel in the fourth quarter if the items produced are suitable for low-cost housing. Manufacturers of steel industrially-made houses, sections and panels of this type should apply to CPA immediately on Form CPA-4491 for their November and December requirements of steel.

The listing of boilers, builders' hardware, furnace pipe, screwed pipe fittings, heating registers and grilles, and woodworking machinery on Schedule I makes producers of these items eligible for CC ratings to obtain production materials, capital equipment for replacement only, and maintenance, repair and operating supplies. They are not eligible for CC assistance for construction. Woodworking machinery, including power-driven saw blades and saw bits, was added to Schedule I.

The builders' hardware added to Schedule I was of the following kinds only: butts, hinges and hasps; door locks and lock trim; sash, screen and shelf hardware; night latches and deadlocks; spring hinges, and sash balances and sash pulleys. The screwed pipe fittings added were in the following classes: gray cast recessed drainage, 2 in. and under; gray cast steam fittings, 3 in. and under (125 lb steam working pressure); malleable fittings including unions, 2 in. and under (150 lb S.W.P.).

Ferromanganese Output Up

New York

• • • Production of ferromanganese rose sharply in the second quarter of 1946 and was chiefly responsible for a 56 pct increase in the use of manganese ore, according to the Bureau of Mines, U. S. Dept. of the Interior. Consumption of manganese ore during the second quarter totaled 274,089 short tons compared with 176,056 tons in the first quarter of 1946 and 371,465 tons the average quarterly consumption in 1945.

Says Kitchen Utensil Output Speeded By Induction Soldering

Pittsburgh

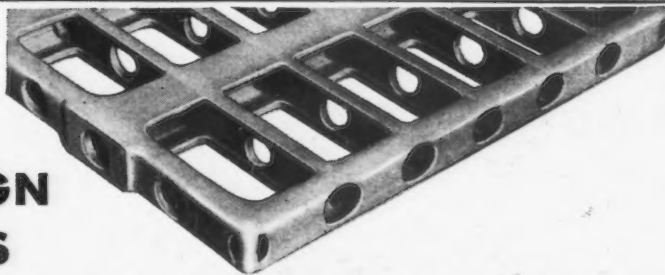
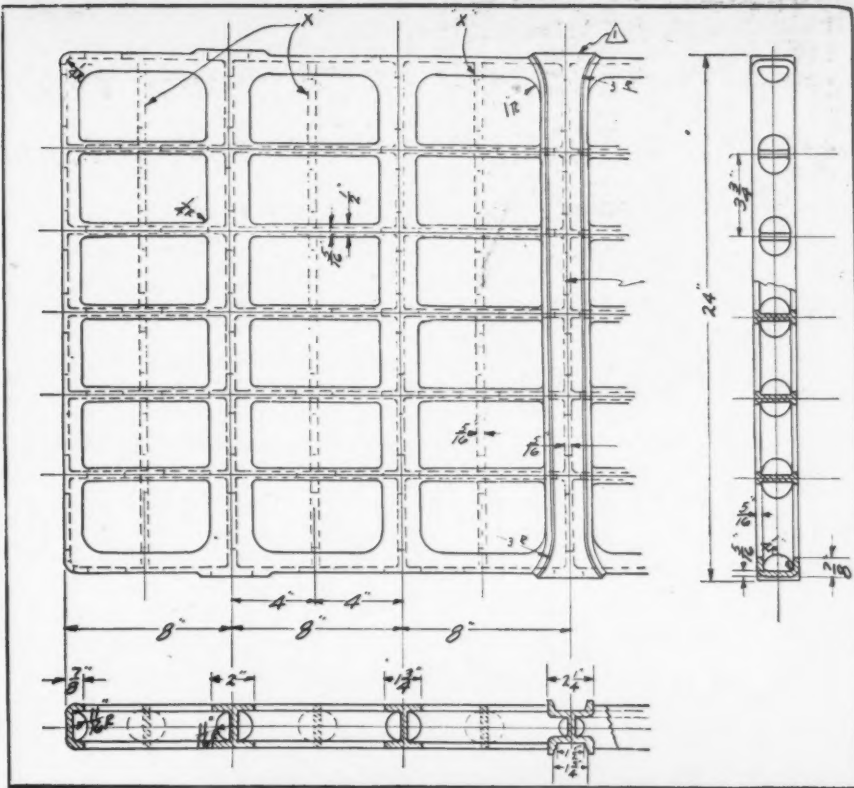
... Breaking into the limelight of new and better methods of production, induction heating is making great strides in proving its value to industry according to L. Gise and J. R. Stewart, Westinghouse Electric Corp., Philadelphia, Pa. When applied to the soldering of stainless steel kitchen utensils at the Adel Precision Products Corp., Huntington, W. Va., it resulted in an increased production rate, in a reduction of labor costs, and in an improvement of the quality of the product, according to Messrs. Gise and Stewart.

Under the system of hand soldering, only one utensil could be turned out by one man per minute. Of this production, many turnbacks were encountered, and machine polishing of the finished product used up much additional time before the utensil was ready for packaging, it was said. Welds were unsatisfactory, and labor costs were considered too high.

Mr. Charles W. Hawk, the company's project engineer, recommended the installation of a 20 kw, 450 kc R-F generator. The production line of kitchen utensils on which this generator operates, turns out six items which are later sold as a unit. In the set are two forks, two spoons, a cake turner and a spatula all made of stainless steel and topped with a durable plastic handle.

Ten women and two men form the production line. Shanks formed in another part of the plant are first inspected at the start of the finishing table and placed in a frame. As they pass from one operator to another, a slotted ferrule is placed on one end of each shank, followed by a wire ring of silver solder inserted at the interior joint of ferrule and shank. A small amount of flux is then added where solder and ferrule meet the shank.

Pieces finished to this point are placed in their frame under induction heat to join together the ferrule and shank. The coil used for this operation is a multiple of twelve single turns in series. After completing the 15 second heating cycle of 1250° to give the joint the required tensile strength, the



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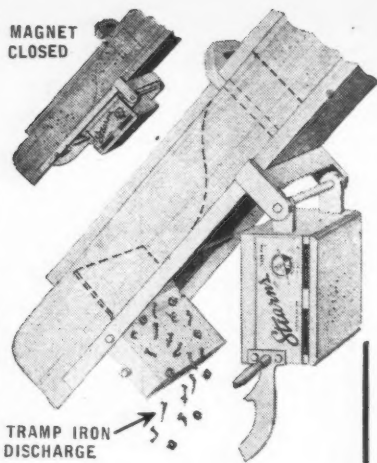
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pieces are removed from the frame and rinsed in a special alkali cleansing bath. They are then sent to another factory where plastic handles are fitted around the upper shank and into the ferrule at 4500 lbs pressure.

Upon return to the manufacturer the shanks are placed in another frame along with the blade of the utensil being made. Flux is painted on the spot where blade and shank are to be joined. A narrow strip of silver solder is then placed in its proper position on the back of the blade. Flux is also painted on the beveled end of shank and the frames are locked. At this point, the R-F generator takes over the finishing operations.

For this last heating process, a unit of four coils in series is used. Each coil is made in approximately three quarters of a turn. The prepared frame is placed in very close proximity to these coils, and a heat-

ing cycle of 12 seconds is applied to seal the joints. The finished utensils are then released from the frame and rinsed in a hot alkali cleaning solution—the same as that used in preparing the shank and ferrule for the plastic handle. When the units have cooled, polishing is accomplished by holding the tools against a motor-driven polishing wheel.

An evaluation of the costs of this installation reveals considerable savings. The initial investment, including the R-F Generator, work coils and production line, was about \$10,000. Total operating costs amount to approximately \$10.80 per hr, of which \$10 per hr is for labor and 80¢ per hr is for the R-F Generator. The latter figure includes power cost at the rate of 1¢ per kwh tube replacements based upon 5000 hr average life, and amortization of the generator over a period of 30,000 hr operation.

Weekly Gallup Polls

(CONTINUED FROM PAGE 115)

population in the United States and Britain.

In both countries, the evidence from nationwide polls of public opinion indicates a strong tide of public disagreement with the course Russia has been following in world affairs.

The poll results are significant in the light of Henry A. Wallace's speech on Russia in New York recently. In general, public sentiment in this country is more in accord with a policy of firmness toward Russia than a policy of appeasement.

Changes in attitude toward Russia on the part of the British and American publics are shown in polls taken by the British Institute of Public Opinion in Britain during the summer, and by the American Institute in this country in early September.

Since the wording of both surveys is the same, the results are comparable, except that the American results, being of more recent date, reflect American reaction to events of more recent date than the British poll does.

The question:

"Are your feelings toward Russia more friendly or less friendly than they were a year ago?"

U. S. SENTIMENT	Pct
More Friendly	2
Less Friendly	62

About the Same	28
No Opinion	8
BRITISH SENTIMENT	
More Friendly	8
Less Friendly	41
About the Same	41
No Opinion	10

Among veterans of World War II both here and in England a greater proportion feel less friendly than is the case with the population as a whole.

The reasons people here in the United States give for feeling as they do shed light on the problem which Russian leaders face if they are to convince Americans that the Soviets are following a desirable course in world affairs.

At present, voters say they think Russia doesn't try to cooperate with us at the peace conference, that the Soviet is undemocratic, secretive, that Russia is out to run the world.

Other institute polls show that the feelings expressed in these reasons are widespread.

Institute polls have found seven in every ten declaring themselves disapproving of the course Russia is presently following.

Another nation-wide poll reported that six of every ten think Russia is out to dominate the world.

The London Economist

(CONTINUED FROM PAGE 119)

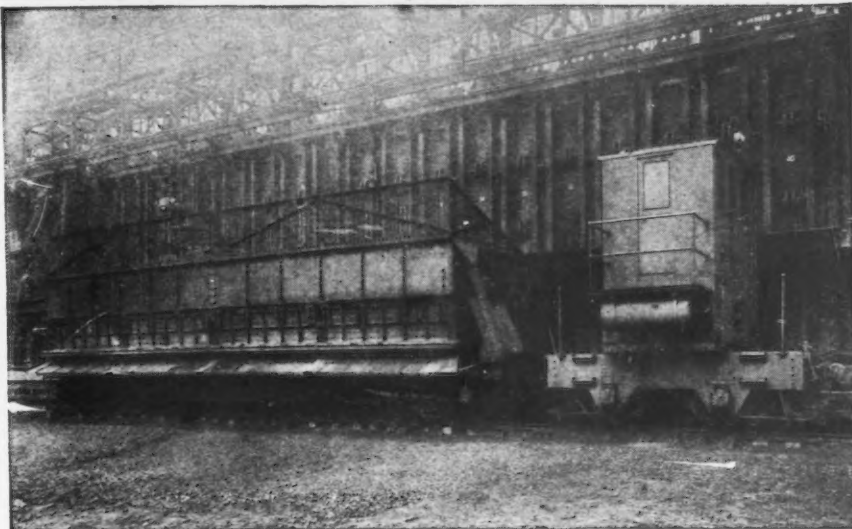
among the yearly intake are the junior leaders and instructors of a training organization. That will be a real revolution for the army. Obviously the prewar army never consisted exclusively of old soldiers who could serve their time and never earn a stripe, but if any of those are to be found in the post-war long-service army, then, to that extent, the army will be failing in its task. If Field Marshal Montgomery is anxious that the soldier should have a chance to read in bed, it may well be that his main concern is to secure recruits who want to read anywhere.

An allied problem is the question of equipment. It is a poor policy to wait until a war breaks out to invent and develop the weapons to win it. In this century no army has been prepared for the wars it has actually fought. Even the German army was prepared only for the campaigns in Poland and France. Thereafter on both sides it was a race of improvisation and adaptation from what already existed or could easily be made. If there is one outstanding need at the moment it is to combine lightness with strength. When the Ministry of Supply can produce the equipment for an airborne armored division, it will have excuse enough to celebrate the occasion with a round of drinks.

Still, the problem must in the end come back to the man reading in bed, the destruction of the existing barracks and married quarters in garrison towns, buildings that would disgrace a 19th century colliery village, the cries of "See the World" and "Learn a Trade;" even the better pay now available for officers and men will not of itself make army life as attractive to the men it needs as civilian life is. Something more is required. One advantage the army has — an achievement of its own for which it is not always given proper credit. It has managed to preserve an *esprit de corps* that has avoided both militarism and theatricality. The army loyalty to the Service, to the regiment, is a living tradition that is still capable of capturing the average man.

But that is only half the story. Of itself it will not prevent the conscript from leaving at the end

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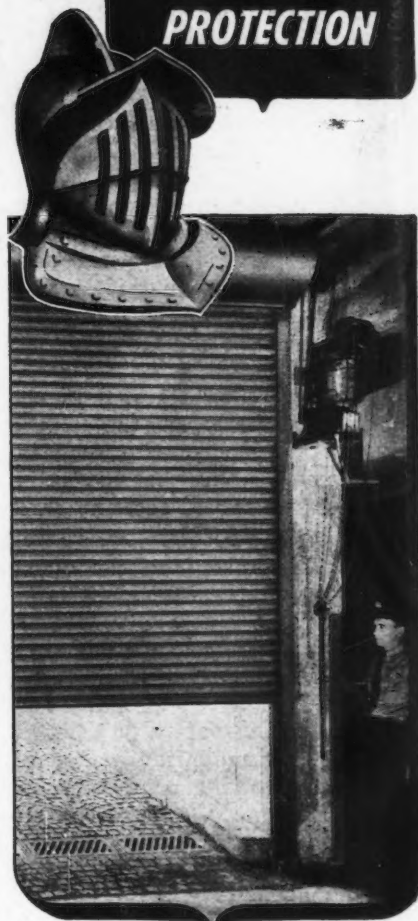
of his eighteen months. What is the ingredient in the professional soldier's life which will hold the right percentage of the right men after their period of compulsory service is over? There is no easy answer. Discipline is discipline and cannot be avoided, and many men will walk out from it as soon as they can, however many other inducements there are to stay. But a great deal can be done to capture the interest of the right men.

The retention of the wartime plan of commissioning officers only from the ranks is an obvious step in the right direction. There are certain to be a great many other detailed suggestions to this end, from current affairs talks to training for a civilian trade at the end of the period of service. Those that are successful will be found to have one common factor: it is that they increase the ways in which a man can see how he can acquire responsibility, together with the training to carry it successfully, for that is the most powerful magnet there can be to retain the interest of the best men. In an army the tendency is, unfortunately, generally the other way.

The ordinary soldier has too few responsibilities. He has never to worry about a supply of food, shelter, clothing or money. All are handed to him by the machine at regular intervals. In consequence, he is frequently treated as no better than the end-product of a machine. If the army machine is not ready to use him he stands around idle, as though his superiors believe that idleness was the most attractive gift they could offer him. On the contrary, what attracts the man of any capacity is hard work with responsibility when he knows that he should be working, and freedom from petty restrictions when he knows he is supposed to be free.

If the Army Council will give as much attention to seeing that the men are given intelligent and progressive work as they intend to devote to the soldier's leisure they may be pleasantly surprised at the number of long-service recruits they will attract at the end of a year. But if the army is allowed to slip back into the old "half a day's work for half a day's pay" tradition, it will cease to resemble the army the country created during the war, and of which it has so much reason to be proud.

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